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GEOLOGICAL SURVEY OF ALABAMA

WALTER B. JONES, STATE GEOLOGIST (ON LEAVE)

BULLETIN 47

BAUXITE DEPOSITS OF ALABAMA

BY
WALTER B. JONES

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BAUXITE DEPOSITS OF ALABAMA

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LETTER OF TRANSMITTAL

University, Alabama
September 10, 1940.

Honorable Frank M. Dixon,
Governor of Alabama,
Montgomery, Alabama.

Sir:

I have the honor to transmit herewith the manuscript of a report on the "Bauxite Deposits of Alabama", by Walter B. Jones. It is requested that this be printed as Bulletin 47 of the Geological Survey of Alabama.

Respectfully,

STEWART J. LLOYD,
Asst. State Geologist.

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INTRODUCTION

Three-quarters of a century ago, metallic aluminum was known as the wonder metal and was a laboratory curosity. Small amounts were originally produced in the laboratory only from the mineral cryolite (Na_3AlF_6) but the metal was finally carried from the laboratory into the commercial field through the efforts of Deville. The discovery that bauxite could be used as an additional ore of the metal and the rapid development of electro-metallurgy showed production to be possible at such a low cost that aluminum rapidly became one of the cheapest and most widely used of all metals.

While bauxite is principally used as an ore of aluminum, some of it is utilized by the chemical industry in the manufacture of alum and other aluminum salts. Some bauxite is used as an abrasive in the manufacture of grinding wheels, oilstones and abrasive cloths, papers and powders. Activated bauxite has been utilized to some extent as a substitute for fuller's earth and bleaching clay in the refining of crude petroleum.

None of the Alabama bauxite is used for the metal industry, the entire output finding its way into industrial channels, particularly the chemical industry.

Much has been written regarding the world deposits of bauxite, and no effort will be made to discuss them in this report, except perhaps to call attention to certain characteristics of them which have a direct bearing on Alabama deposits.

Bauxite was first found at Baux, a small village in southern France and derived its name from the discovery site. The material was highly ferruginous, but was too refractory to be used as an ore of iron. The occurrence at Baux is in pockets in highly tilted beds of limestone, sandstone and clay of Upper Cretaceous age. The bauxite is associated with the limestone and is similar to the Alabama deposits in that respect. The ore at Baux was unsuccessfully tried out as an iron ore until an analysis by Berthier disclosed its real character.

An account of the original discovery was given by H. Coquand,[1] who described the new mineral as pisolitic, compact and earthy.

---

[1] Bull. de la Societe Geologique de France, vol. 28, p. 98, 1871.

Most of the deposits subsequently discovered carry ore which falls into this classification. Following the discovery at Baux, other deposits of bauxite were reported from localities in southern France, Ireland, Austria and Italy. Some of these were associated with limestones while others were in contact with gneiss and basalt.

In the United States bauxite was first discovered in Pike County, Georgia, in 1887. Rock Run, Cherokee County, Alabama, seems to have followed this, in 1889, while in 1891 extensive deposits in Pulaski County, Arkansas, were uncovered. The northeast Alabama-northwest Georgia belt was later found to extend into Tennessee.

Physical and Chemical Properties

Bauxite was originally considered to be simply a hydrate of aluminum, but subsequent study has disclosed at least three different substances in the ore, as follows:

Diaspore ($Al_2O_3.\ H_2O$), a definite mineral in crystalline form.

Bauxite ($Al_2O_3.\ 2H_2O$), of doubtful existence and not yet positively identified.

Gibbsite or Hydragillite ($Al_2O_3.\ 3H_2O$), a definite mineral in crystalline form.

It is the opinion of the writer that it would be better to consider bauxite as an ore rather than a mineral, at least until it can be shown to possess definite properties, whether they be crystalline or amorphous. In this respect, the word "bauxite" will be used to refer to an ore of aluminum, regardless of the range of composition.

Bauxite has a specific gravity of 2.40 to 2.55 in the better grades, and a hardness of 1 to 3. It is normally pisolitic or concretionary, with individual "eyes", ranging in size from the dimensions of a pea to several inches in diameter. The pisolites may be solid or hollow, or partially filled with a white to straw-colored powder. Often, complex structure in the pisolites is observed, a large one carrying a number of small ones.

In color bauxite ranges from almost pure white, through cream white, gray, yellowish, straw-colored, pink, amber, brown, dark red to almost black. These colors shade from one to the other, either gradually or suddenly and most of the colors usually appear in all deposits.

The variety of color found in the pisolites is no greater than that exhibited by the matrix or cementing material which fills up the interstices between pisolites. This may be good bauxite or flint, clay or limonite, sometimes siderite (iron carbonate), less often manganiferous limonite and occasionally sand. The matrix may be very hard or it may be so soft that upon exposure the mass crumbles into what is well-known as "buck-shot" ore. If the matrix is harder than the concretions, the broken surface has a vesicular appearance. In other varieties, the pisolites and matrix may make such a homogeneous mass that fractures will be smooth. Often, bauxite is earthy, resembling loose clay and entirely without the characteristic pisolitic structure. Some of the best bauxites are of this type.

As a general rule, the hardness of the boulder type of bauxite depends upon the amount of iron oxide present, although some of the hard ores carry rather large amounts of silica.

CLASSIFICATION OF THE ORES

In presenting this classification, the writer realizes fully that it is often a matter of personal choice as to the proper status of a given ore, and that there are variations from one class to another, but the need for descriptive terms for the ores is the all-important factor. Even though there will be exceptions to the classification, if the general limitations are kept in mind, there should be no particular trouble in following the descriptions.

Boulder. This class comprises the "donecks" of the miners and ores of this type vary considerably in size and composition. The round boulder shown in this figure (Figure 1) from the Consolidated No. 2 pit, Dekalb County, is a typical example of the northeast Alabama ore. These large concretions are invariably complex pisolitic (see Figures 2 and 7), and the pisolites within the masses show the usual variations in size and character. In the southeast Alabama deposits, the boulders are frequently angular instead of rounded. Most of the highly ferruginous ores fall in this group.

Pebble. In this class are placed those ores which are composed of individual pisolites ranging in size from ½ inch to several inches in diameter (see Figure 3-6). These may or may not have the complex pisolitic structure. The simple structure pebbles are always of the smaller sizes. In the banks this grade has the appearance of a loosely cemented, rounded gravel bed, and in reality, the pebbles may have been water worn before being deposited. In this case the matrix is apt to be of the same material.

Buck-shot. By a further decrease in the size of the individual pisolites, to that approximating buck-shot peas, (see Figures 8-11), there comes this very important and characteristic class. These ores are found most often in the outcrops and in the zones of the best ore, where the pisolites are loosely cemented with the same kind of material as is found in the concretions. Buck-shot ore in Alabama is usually high grade but this cannot be accepted as an invariable rule.

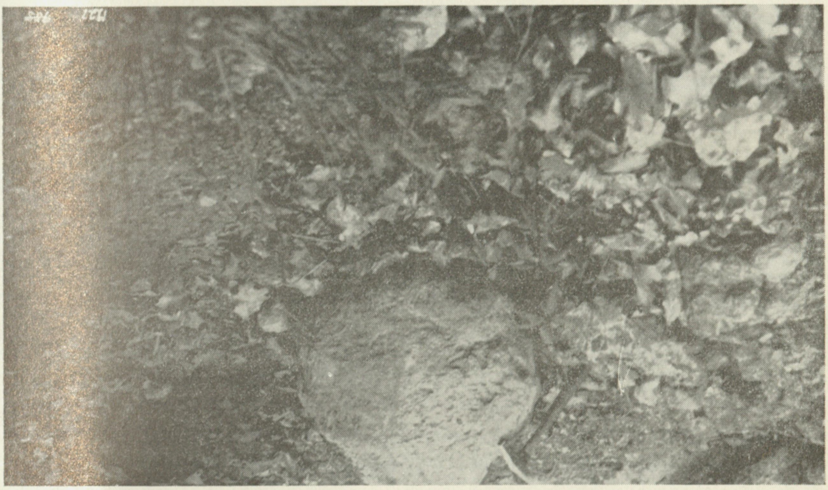

Figure 1:—Boulder Ore from DeKalb County, Alabama.

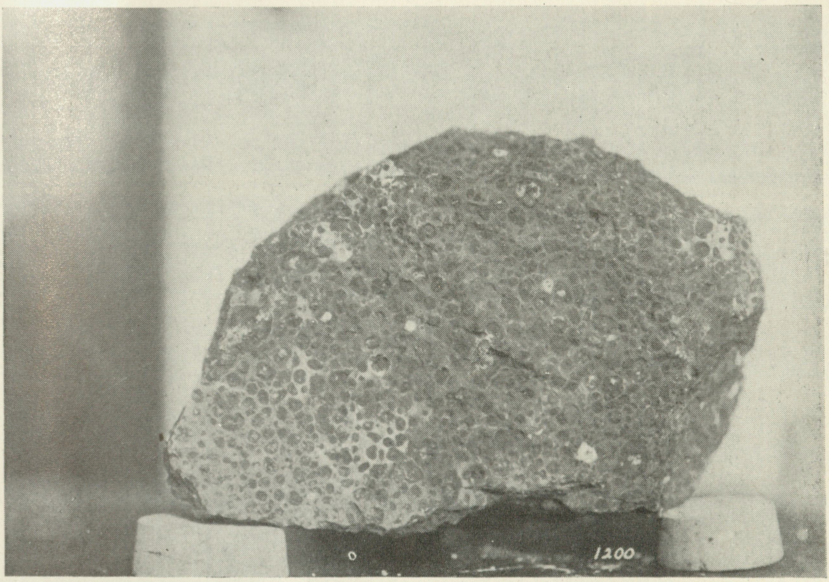

Figure 2:—Boulder of solid pisolites.

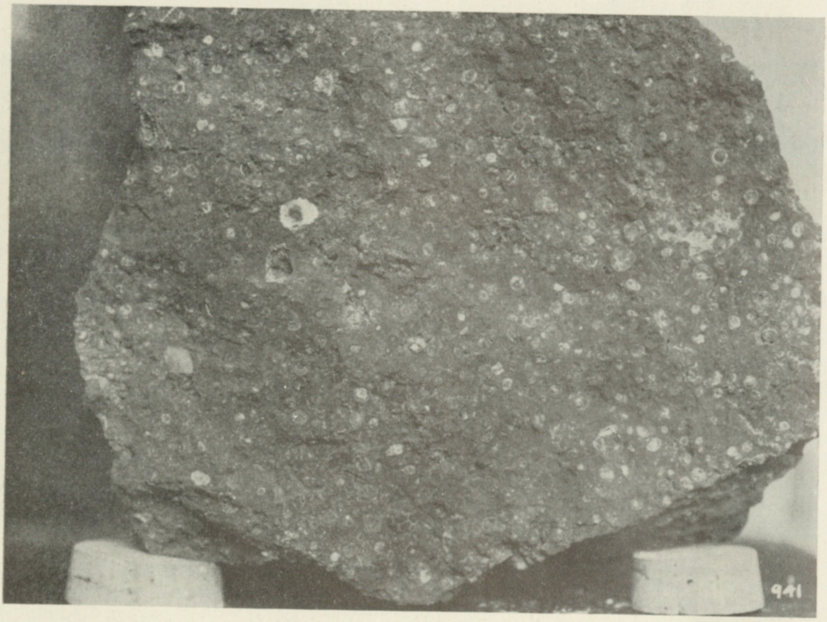

Figure 3:—Hard ore, showing solid pisolites.

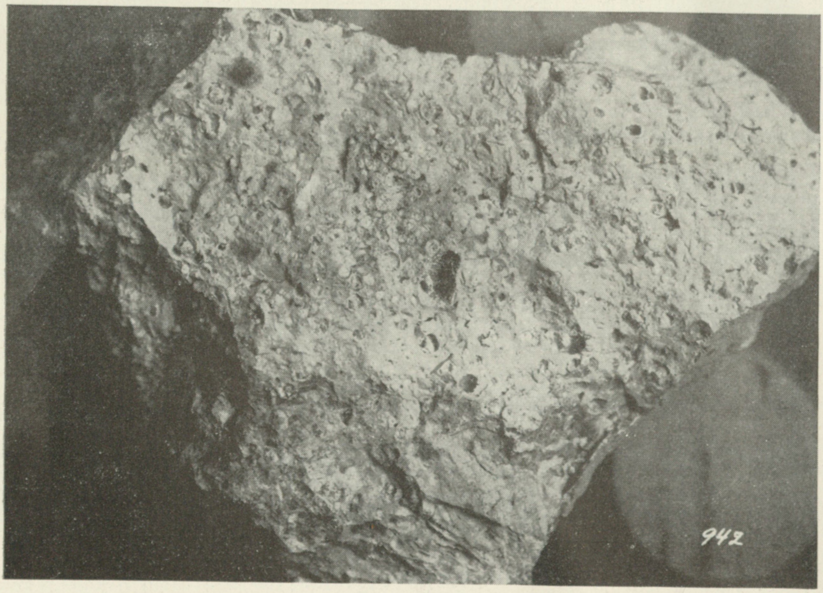

Figure 4:—Hard ore; pisolites both hollow and solid.

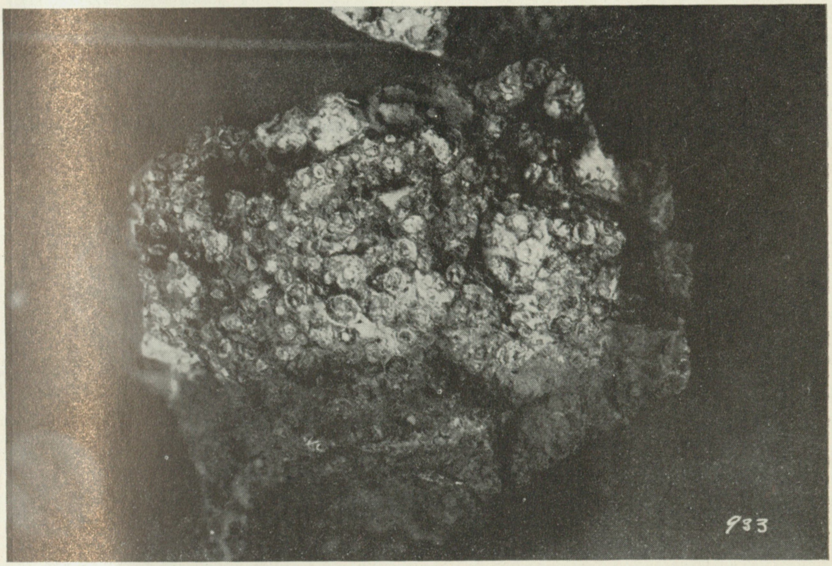

Figure 5:—Hard ore; pisolites hollow or filled with soft material.

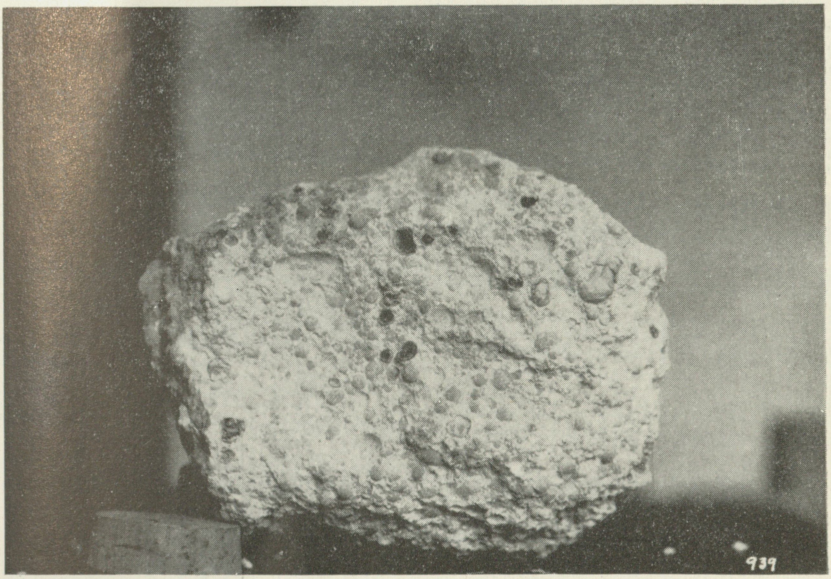

Figure 6:—Soft ore from Colbert County, Alabama.

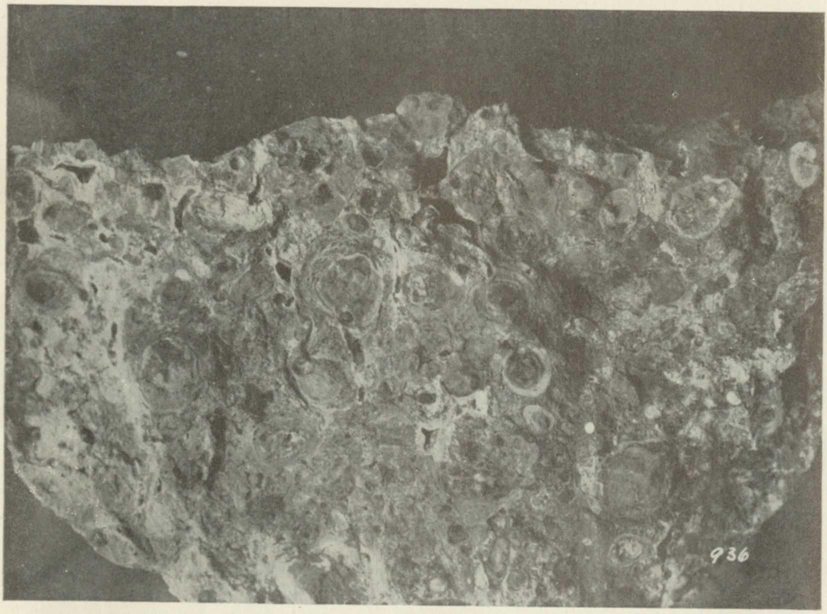

Figure 7:—Boulder ore showing complex structure.

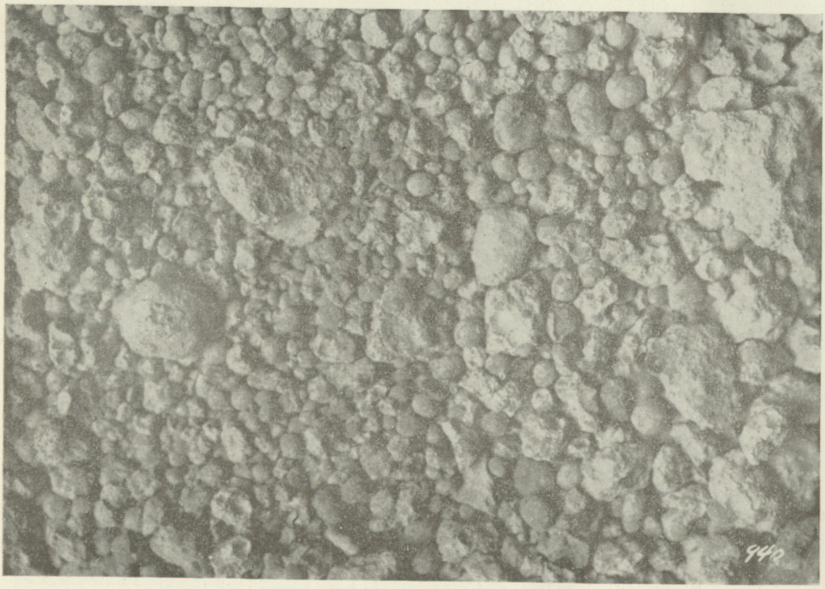

Figure 8:—Buck-shot ore.

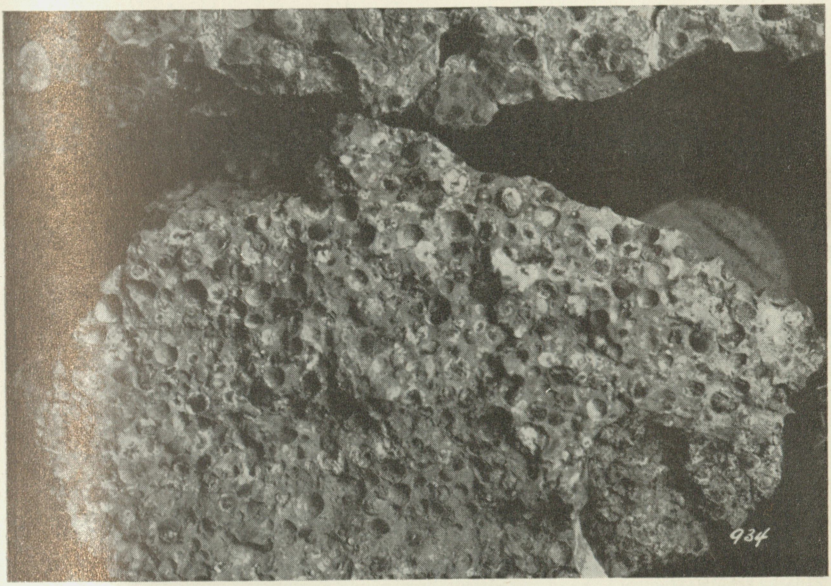

Figure 9:—Buck-shot ore.

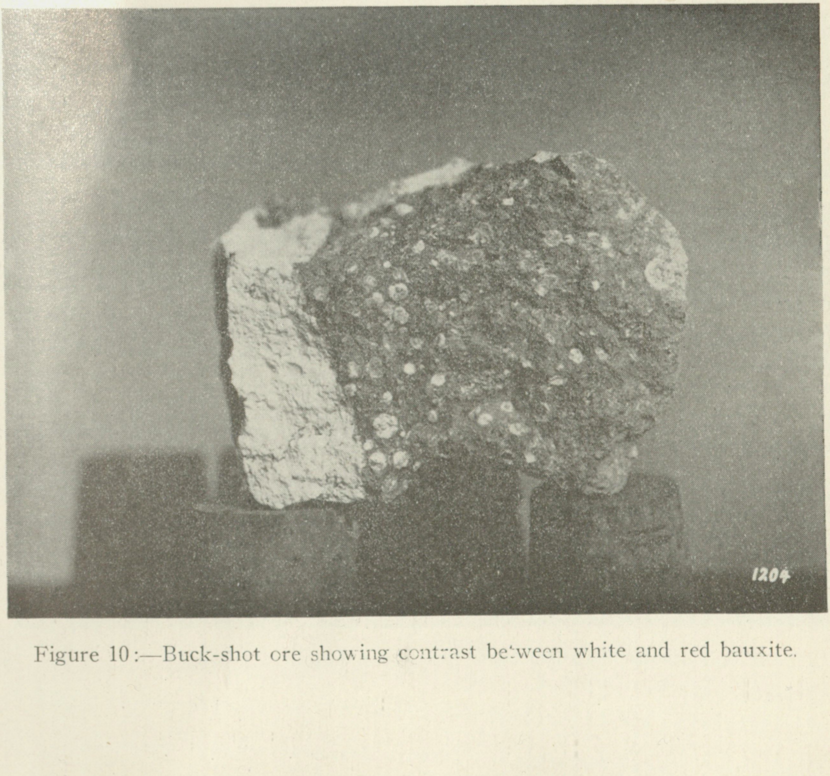

Figure 10:—Buck-shot ore showing contrast between white and red bauxite.

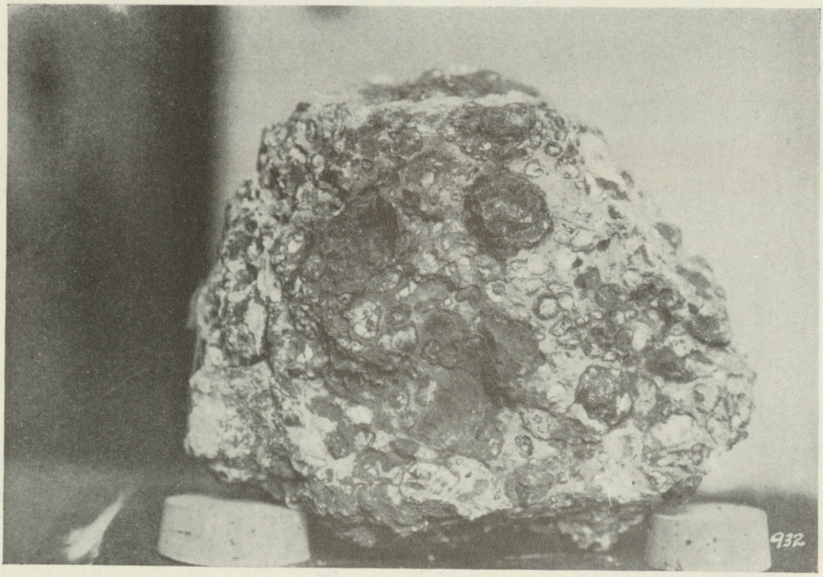

Figure 11:—Buck-shot ore with solid pisolites both simple and complex in structure.

Oolitic. In this class are placed all the ores which have pisolites smaller than those of the buck-shot group (see Figures 12-14) Here also, are apt to be some good ores. Many of the northeast Alabama deposits, notably the Carr banks, have oolitic ores, (see Figure 13) although the Carr ores are not very high grade.

Compact. Here are placed the ores which may or may not be pisolitic, but which are firm enough to break smoothly across pisolites and matrix alike. In this class falls many of the best ores of the southeast Alabama belt. Many of the ores of the *boulder* type carry these characteristics also, but may be differentiated readily in the form of occurrence.

Earthy. Many of the ores are not pisolitic at all, or very slightly so, and these may range in composition from clay to very high grade bauxite (see Figure 15). The hazards of venturing opinions as to quality of ore apply most directly to this class! The best of these ores are open-textured, chalky material, and such ores were found in many of the pits in northeast and southeast Alabama.

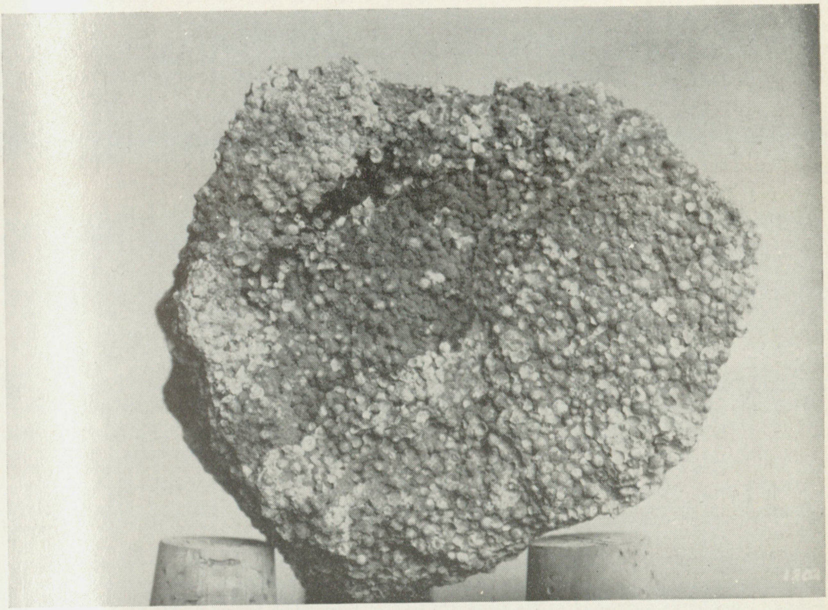

Figure 12:—Oolitic hard ore.

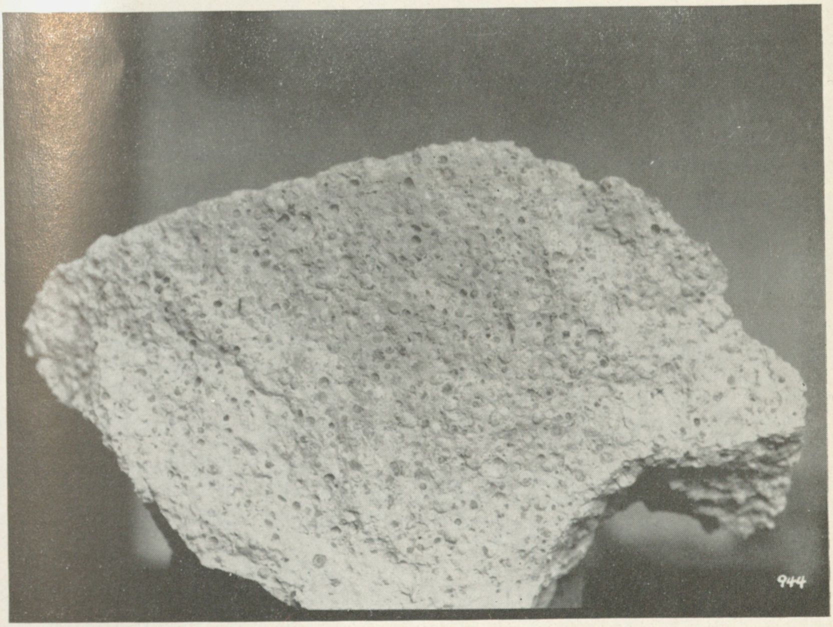

Figure 13:—Hard oolitic ore from the Carr banks.

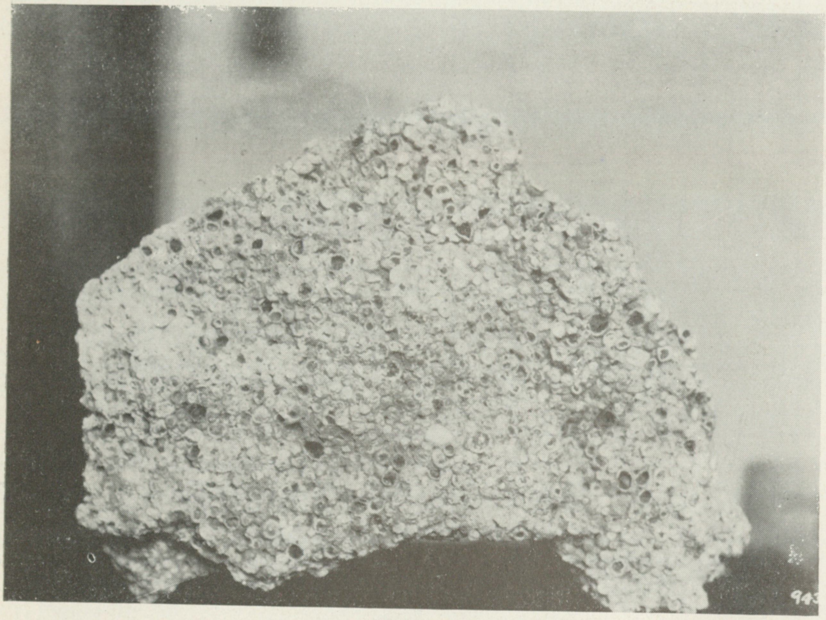

Figure 14:—Oolitic hard ore.

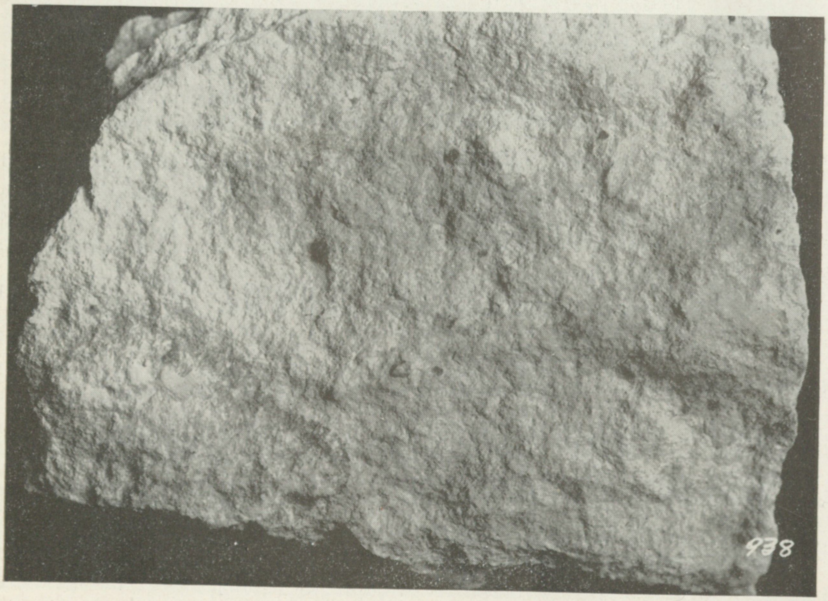

Figure 15:—Earthy ore.

DEPOSITS IN ALABAMA

Introduction. Soon after the writer's return to the Alabama Survey in 1924, it became apparent that a report on the bauxite deposits of the State would be very much in order. Although the deposits were among the first known in America, the only reports on them were McCalley's[2] papers and a few other short references in various reports of the Survey and elsewhere.[3] In carrying out the field work, the season of 1925 was spent in the Margerum district of northwest Alabama and in Barbour and Henry counties, in the southeastern part of the State. In 1926, the belt in northeast Alabama was visited. Samples were carefully taken, and much material brought in for study and analysis. It is thought that samples were secured from every known ore-body in the State. Since 1926, several short trips have been made to all of the areas, and additional information gathered.

Due to the fact that there was no mining in progress in northeast Alabama at the time of the writer's visits, and also because the old reports have been out of print for many years, much of the data gathered by former writers will be included in this account.

Acknowledgments. Among the many people throughout Alabama who have contributed heavily to this work, J. W. Adams of Sheffield, stands out. Mr. Adams provided maps of the Margerum deposits, accompanied the writer on many excursions through the area, and turned over to him all analyses and records of detailed prospecting carried out by the Alabama Bauxite Company, with which he is associated. In addition to all of these courtesies, a splendid camp house on the property was turned over to the party during its stay there. To J. L. Andrews, of Sheffield, also associated with the Alabama Bauxite Company, is due much credit for the efficient way in which the party was enabled to carry out its work.

In the Barbour-Henry county district, the late Senator J. M. Espy and Ed Espy, of Abbeville rendered invaluable service. The latter, with Matt Griffin and Bob Richards were particularly helpful in the location of ore-bodies and the identification of land lines.

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[2] McCalley, Henry. Alabama Bauxite, Ala. Ind. & Sci. Soc., Vol. 2, pp. 20-32, 1892. *Ibid.* Coosa Valley Region. Ala. Geol. Surv., Special Report 9, 1897.

[3] Hayes, C. W., Bauxite. U. S. G. S. Ann. Rept. Vol. 16, Pt. 3, pp. 551-597. 1895.

Mr. Espy accompanied the author on many of his tramps through the woods, and this great service will ever remain a most pleasant memory. The writer is deeply grateful to Mr. and Mrs. Jesse Richards, of Richard's Cross-roads, for their many kindnesses during the several weeks tent-residence near their home.

While examining the widespread deposits in Talladega, Calhoun and Cherokee counties, the party was befriended on many occasions by many people, and it will not be possible to list all of them here. However, we must express our appreciation for the splendid cooperation of Dave Garvin, of the Rock Run Iron Company and a brother of the late J. M. Garvin, whose name is emblazoned in large letters on the roster of famous charcoal iron makers of Alabama. The party was most pleasantly encamped for three weeks at Sanford's Spring, on the lands of the Rock Run Iron Company. Tom Cowan accompanied the writer on many of the trips to deposits in the vicinity of Piedmont and to him goes warmest thanks for this valuable help.

Discovery in Alabama

There seems to be some doubt who made the original discovery of bauxite in this State, and, because of a lack of confirmatory information now available, the accounts given by McCalley[4] are reproduced below:

> "The honor of its first discovery in Alabama, from the best information at hand, is due to Mr. J. R. Trotter, the mining boss of the Dykes limonite banks, of the Bass Furnace Company, Cherokee County. Mr. Trotter, so he says, had for a long time noticed in and near his ore banks what was to him a peculiar rock, and so in the spring of 1889 he sent a sample of it to Mr. J. M. Garvin, Superintendent of the Bass Furnace Company, Rock Run, to have it analyzed for him. Mr. Garvin sent the rock on to their chemist, in Fort Wayne, Ohio, and in due course of time, so the story goes, the report came that the peculiar rock was bauxite, a valuable ore that carried nearly 30 per cent of Aluminum, a metal that was then worth 300 times as much as iron or about $3.00 per pound. After the reception of this letter, many outcrops of the ore were found in the neighborhood of the Dykes Bank."

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[4] McCalley, Henry, Alabama Bauxite—Ala. Ind. & Sci. Soc., Vol. 2, pp. 20-21, 1892.

While the above manuscript was awaiting publication in the proceedings of the Society, Mr. R. S. Perry, General Manager of the Southern Bauxite Mining and Manufacturing Company, Piedmont, wrote that the bauxite of Cherokee County was not known as such until the fall of 1890, that before then it was known by the miners as iron ore blossom. He said that he was entitled to the credit of the first discovery or identification of Alabama bauxite, in April or May, 1890, in a deposit in Calhoun County some 8 miles south of Piedmont. He wrote further that he identified the ore of a deposit near Jacksonville on June 7th or 8th, 1890.

Later in his report on the Coosa Valley regions, McCalley[5] makes the following statement:

> "It was first discovered or recognized in Alabama in 1890 by Mr. R. E. Perry, now superintendent of the Southern Bauxite mining and Manufacturing Company."

Even though the literature is filled with statements to the effect that bauxite was first discovered in Alabama 1889, the writer is inclined to accept the Perry account, although admitting that everyone is welcome to his own choice in the matter.

According to McCalley[6] the next bauxite find in Alabama (counting the Dykes banks as the first) was at the Walker limonite banks near Jacksonville, Calhoun County, and afterwards a third deposit was found at the old Laney Manganese banks in the edge of Cleburne County, some two and a half miles to the southwest of Rock Run Station. About the time of the writing of McCalley's report, above referred to, two deposits were discovered near Anniston, in Calhoun County.

In later years, two ore bodies near Fort Payne in Dekalb County were opened up, followed by discoveries in Barbour and Henry counties, and finally a large number of scattered deposits near Margerum, in Colbert County.

---

[5] McCalley, Henry, Valley Regions of Alabama (Paleozoic Strata), Part 2. Coosa Valley Region. Ala. Geol. Surv., Special Report 9, p. 79. 1897.

[6] McCalley, Henry. Alabama Bauxite. Ala. Ind. & Sci. Soc., Vol. 2, pp. 21, 1892.

Distribution of Alabama Deposits

At the present time, deposits of bauxite are known in three general regions, each exhibiting characteristics geologic conditions (see fig. 13). These groups, in the order of their discovery, are:

1. Cambro-Ordovician contact, with deposits in Cherokee Calhoun, Talladega and DeKalb counties.
2. Midway-Nanafalia contact, with deposits in Barbour and Henry counties.
3. Cretaceous-Mississippian contact, with bauxite known only from a limonite area south of Margerum, in Colbert County.

The history of the discoveries in the past makes it probable that additional deposits may be uncovered at any time. In fact, this was a prediction of McCalley,[7] who wrote:

> "Other deposits will doubtless still be found in this (Rock Run-Anniston belt) and perhaps other sections of the State."

This statement has been verified, not so much by additional discoveries in group 1, but by groups 2 and 3, both of which are very important.

The existence of unexplored areas within the belts shown inside the black lines of figure 1, makes it most likely that the area of known deposits will be much extended. There is no reason why future prospecting in these regions should not be rewarded. For example, group 2 carries comparatively large deposits in Georgia, many ore bodies in Barbour and Henry counties, Alabama, and a large number of rather siliceous deposits in Mississippi. It would hardly seem possible that there would be 300 miles of barren territory in the country between the two regions.

Mining

Since the occurrence of bauxite ore-bodies is within the zone of weathering and therefore near the surface, the mining of the ore is accomplished by slip scoops or steam shovels. In the early days of the industry, both stipping and mining were by hand loading into wagons for haulage. This was necessary at that time be-

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[7] McCalley, Henry. Alabama Bauxite. Ala. Ind. & Sci. Soc., Vol. 2, pp. 21, 1892.

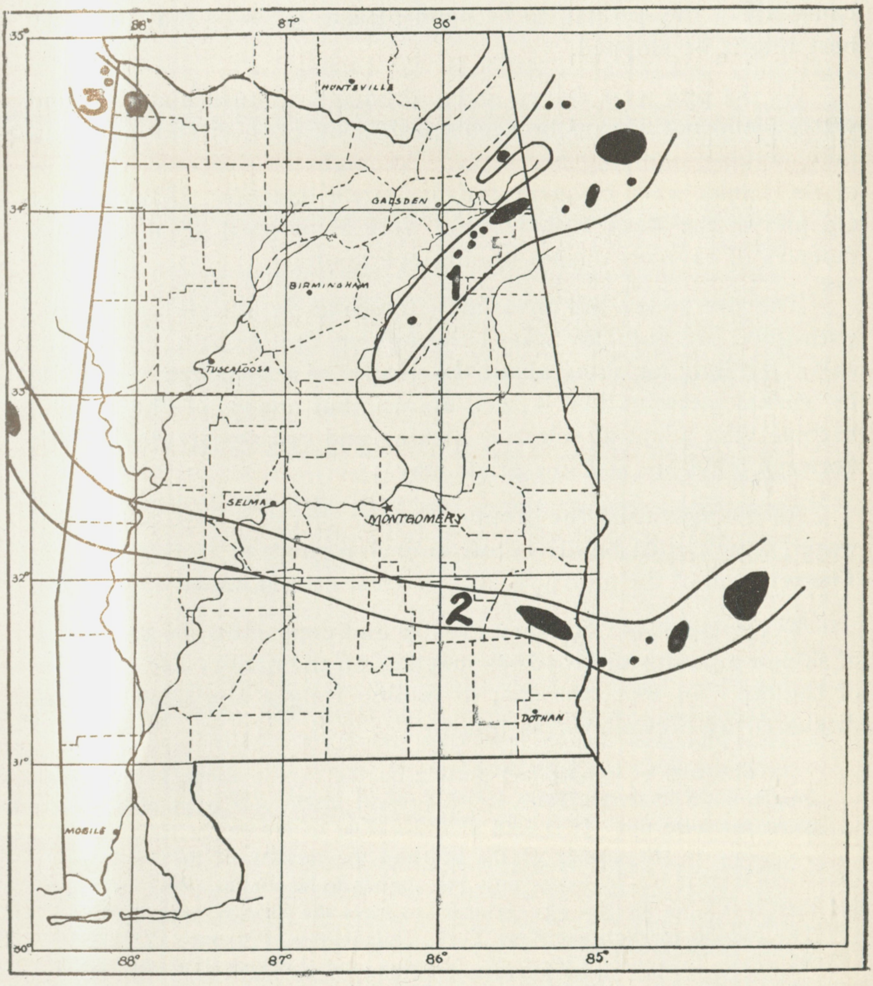
35°
88°
87°
86°
HUNTSVILLE
3
34°
GADSDEN
1
BIRMINGHAM
TUSCALOOSA
33°
SELMA
MONTGOMERY
32°
2
DOTHAN
31°
MOBILE
30°
88°
87°
86°
85°

Figure 16:—Sketch map of Alabama, showing the distribution of known deposits of bauxite, and possible areas (within black lines).

cause all of the ore had to be hand picked, in order that the very best might be shipped.

As the pits were driven down, drainage of surface and ground water could not always be accomplished by open ditches and tunnels, making pumping necessary. As might be expected, cave-ins of the banks were frequent causing much damage. Many of the old pits in the Rock Run District were abandoned because of the dangers of cave-ins during mining operations.

The ore-bodies are invariably irregular in outline and depth, with good ore and clay mixed throughout the deposit. The difficulty of telling anything about the quality of a specimen of bauxite by casual examination is well-known, but many of the miners become very adept at selective picking and can readily distinguish between good ore and low grade clay.

As it comes from the ground, bauxite carries a large amount of water, which must be driven off in drying sheds or in rotary kilns. The removal of the moisture saves a great deal in haulage expenses.

The costs of mining vary greatly and depend on the proximity of shipping points and roads as much as on the quality and quantity of the ore. In 1895, the cost of mining freight and markets was discussed by McCalley's[8] as follows:

> "The cost of mining and putting on the cars is about $3.45 per long ton. The freight rates to the present markets is from $4.50 to $9.00 per long ton. It is sold at from $7.00 to $13.00 per long ton, according to the quality of the ore and the locality of the market. If the market is a sea-board city, the ore has to be sold at a less figure than if it is an interior city, in order to meet the foreign competition. The present markets are New York, Philadelphia, Pittsburg, Buffalo, Bayonne, Syracuse, Cleveland, Natrona and Lockport, where are situated the alum and aluminum works. Some of this ore, on account of its superior quality, has been shipped to Germany."

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[8] McCalley, Henry. Coosa Valley Region. Ala. Geol. Surv., Spe. Rpt. 9, pp. 83-84, 1897.

CAMBRO-ORDOVICIAN CONTACT

Occurrence. On account of McCalley's familiarity with the geology of this area, it is deemed advisable to reproduce a part of his account[9] of the early history and geology of bauxite in this section.

> "The Cherokee deposits and the Calhoun deposits, near Jacksonville, like those of Georgia, are near the bottom of the Knox Dolomite Rocks of Safford of Tennessee. These bottom Knox Dolomite Rocks are now believed to belong to the Upper Cambrian. The Cleburne deposit is in the upper part of the Weisner Quartzites, Middle Cambrian, believed to be the same as the Chilhowee Sandstones of Safford. The location of the two other outcrops in Calhoun County, near Anniston, are not known to the writer.
>
> "The Alabama deposits are in a section of country that has been badly broken up by sharp folds and great thrust faults, and in which the character of the rocks have been greatly changed doubtless by the heat that was produced in their folding and faulting. This same heat it is believed, has had a great deal to do with the formation of the bauxite deposits.
>
> "The Alabama deposits are in pockets, though they occur along regular "leads" or follow the lines of outcrops of certain rocks, and show more or less stratification in all of the cuts that have been made upon them. They occur about as do the limonite and clay deposits with which they are closely associated, though seemingly more stratified, in fact they are so closely associated with the limonites and clays that they appear to be greatest where or near where the limonite and clay deposits are greatest.
>
> "The Cherokee bauxite deposits appear to be along two parallel "leads" or lines of outcrops that run in a general northeast and southwest direction (N. 35 deg. to 40 deg. E.), and are from 150 to 200 yards apart. These lines of outcrops seem to follow the crests of two sharp anticlinal folds with a synclinal between them. It is probable therefore that some of the bauxite deposits of these two lines of outcrops, as irregular stratified seams, are continuous under the surface across the synclinal from one line of outcrop to the other. It may be, however, that in places there is a fault along the northwest edge of the norwest line of outcrops or anticlinal. The structure of the rocks however hereabouts cannot be spoken of with any degree of certainty, as they can only be seen at intervals, and even then very imperfectly, the whole country being covered with debris. This debris is nearly altogether of the Weisner Quartzites, the nearest bedded rocks of which are some half a mile to the southwest of the known

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[9] McCalley, Henry. Alabama Bauxite. Ala. Ind. & Sci. Soc., Vol. 2, pp. 21-27, 1892.

bauxite deposits. The largest limonite and clay deposits known of in this immediate section are between the two lines of outcrops or are within the synclinal trough. It is believed that future developments will show the largest bauxite deposits to be also within this synclinal trough.

"The bauxite of these deposits appears to occur in places, at least, over a white or yellow friable sandstone that sometimes is hard and cherty, and under or in the lower part of an unctuous clay that is usually white. The limonite ore is commonly on the top or in the upper part of this white unctuous clay. The bauxite however in places seems to be on the top of the limonite ore. In places it is in the clay, as large masses or as small nodular concretions, and in other places it appears to gradually pass or change into a clay.

"The Calhoun deposit, near Jacksonville, in the few shallow cuts that have been made upon it, also appears to be on the top of a sharp anticlinal. The Cleburne deposit, so it is said, has never been dug into and shows only as a few boulders on the outcrops, and this is most probably the case as to the two bauxite outcrops that have been lately found near Anniston, Calhoun County.

"Though the Alabama bauxite deposits as yet have not been sufficiently developed to enable one to form even a rough approximate estimate of the amount of ore which they carry, still enough has been done on the Cherokee deposits to show that they alone have in them an immense amount of ore. There is no doubt about the Cherokee deposits being large and valuable. These deposits have been dug into in about a dozen places; in some of these places limonite old diggings, the bauxite has been laid bare from a depth of a few feet to that of 75 feet. These deep holes, together with the large outcrops, makes it certain that the ore is in very large quantities, and future developments, it is believed, will show the ore to be in even larger quantities than it now appears to be. I have seen out a distance of about one and a half miles, and Mr. Trotter says that he has seen it on both lines at intervals for a distance of nearly five miles, or from near the Georgia line to near Rock Run. It most likely exists on both of these lines of outcrops in places that have never been seen, being covered up in these places by debris.

"In the northeast end of the Dyke's Bank proper, or the deepest of the limonite old diggings, the bauxite forms an irregular seam of about 60 feet in thickness. It shows from the top to the bottom of this old digging which is about 75 feet deep. The seam is about vertical, though in other limonite old diggings about 200 yards to the northeast, the dip is about 60 degrees to the southeast. In one of these last diggings, the bauxite has been exposed to thickness of 15 feet, though it still forms the floor of the digging and hence it may be as thick here as it is in the big pit or some 60 feet thick. These diggings are all just on the southeast edge of the northwest anticlinal, and hence they are just within the synclinal. To the northwest of the big digging some 200 yards is a fine outcrop of bauxite that must be on the northwest side of the northwest anticlinal. To the southeast of the big digging or Dyke's Bank proper about 200 yards is the bauxite bank of the Republic Mining and Manufacturing Company, of Hermitage, Georgia. The bauxite of this bank is in two irregular seams that are separated from each other by averaging thickness (0 feet to 15 feet) of unctuous clay. The top one of these bauxite seams is about 30 feet thick; the bottom one, when last seen, on September 29, 1892, had not been gone through though it had been dug into to a depth of about 20 feet. The separating clay is of white, blue and mottled colors. This bank crops of bauxite at intervals on both of the lines of outcrops for it is on the northwest edge of the southeast anticlinal, though it may be said to be in the top of this anticlinal, for it is so near the top that the top bauxite seam, which here forms the undenuded crest of the anticlinal, shows within the bank a dip of about 30 deg. to the northwest, and also a dip of about 30 deg. to the southeast. To the northeast of this last bank some 300 yards, on the same or southeast line of outcrops is the Gaines Hill bauxite bank of the Southern Bauxite Mining and Manufacturing Company, of Piedmont, Alabama. This bank is in solid bauxite, and on September 29, 1892, it had been dug to a depth of about 20 feet. So there is no telling how thick the bauxite is in this bank. Still farther to the northeast, some half of a mile, on the same southeast line of outcrops, is the Warhoo bank of the same company as the last. This bank is just on the northwest edge of the anticlinal, though very near the top as it shows the northwest dip and the flattened strata on the top of the anticlinal. This bank is also solid bauxite, and, on September 29, 1892 was about 20 feet deep. So there was no way then of telling how thick the bauxite is in this bank. It looks more like, strictly speaking, a pocket of ore than do the other banks. Still farther to the northeast, about one-half of a mile, are the two Carr bauxite banks, one on each of the two lines of outcrops. These banks had not then been dug into to any depth. To the southwest of the above bauxite bank of the Republic Mining and Manufacturing Company is another bauxite bank of this same company. This bank also appears to be just on the northwest edge of the southeast anticlinal as its bauxite shows both the northwest dip and the flattened strata of the top of the anticlinal. Its floor of solid bauxite, and its sides show a thickness of about 15 feet of ore; how much thicker the ore is in this bank there was no way of telling when visited. The bauxite of this last bank is covered by an unctuous mottled clay, without grit, that on being trimmed with the knife has very much the appearance and feeling of common castile soap. This mottled clay in turn is covered by a deep red unctuous clay that is also free from grit. To the southwest of this last bank for some 200 yards the surface is covered with boulders and nodules of a deep red bauxite that have very much the appearance of old overburnt bricks. To the northwest of this last bauxite bank some 150 yards, there is on northwest line of outcrops in a limonite old bank, a small showing of bauxite in boulders in a mottled clay.

"The Calhoun bauxite, near Jacksonville, shows at intervals in a general northeast and southwest course for some 250 yards. Several shallow pits have been sunk on its outcrops, but not of sufficient depth to prove anything as to the thickness or quality of the ore. These pits appear to be near the top or along the northwest edge of the anticlinal. In one of them the bauxite is exposed to a thickness of 12 to 14 feet, and in another to a thickness of about 25 feet, though in neither of these cases is it exposed to its full unknown thickness. The Cleburne deposit, as has been stated, has never been dug into and shows only as a few boulders on the outcrops, as is likely the case with the two reported outcrops in Calhoun County, near Anniston.

"The bauxites of all the Alabama deposits are hard on the outcrops, especially the red varieties, though as a general thing, they become comparatively soft and crumbly on being dug into. The red coloration in many places on and near the outcrops is due partly to seepage water. These bauxites are mostly pisolitic or concretionary, though some of them are earthy or clay like. In the pisolitic or concretionary varieties, the eyes or pea-like concretions are for the most part uniformly diffused throughout the masses. These eyes or concretions are usually filled with a reddish dust or powder. They are often soft enough to be mashed between the fingers, though sometimes they are very hard. They are usually of the size of a small pea though they occasionally get to be a couple of inches in diameter. These large ones are merely irregular concretionary nodules. The earthy or clay-like bauxite has often a metallic ring. The Alabama bauxites are of white, grey and red colors, though other bauxites are said to be also of pearl-grey, ochre-yellow and brown colors."

Since McCalley's work[10] in the Paleozoic strata of Alabama many changes and divisions have been made, particularly by Butts,[11] but this has not altered the importance of McCalley's early descriptions of these deposits.

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[10] Important reports written by McCalley and published by the Geological Survey of Alabama are as follows:

Special Report 1, On the Warrior Coal Field, 1886.
Special Report 3, Report on the Coal Measures of the Plateau Region of Alabama, 1891.
Special Report 8, Report on the Valley Regions of Alabama, (Paleozoic Strata), Part 1, on the Tennessee Valley Region, 1896.
Special Report 9, (Same) Part 2, on the Coosa Valley Region, 1897.
Special Report 10, Report on the Warrior Coal Basin, 1900.

[11] Butts, Charles. Paleozoic Strata in Geology of Alabama, Sp. Rpt. 14, Geol. Surv. of Ala., pp. 41-230, 1926.

The type section in this area is as follows:

PALEOZOIC	Devonian	Hamilton to Onondaga	Frog Mountain	350′	Red sandstone, calcareous, with thin limestone members, rich in fossils of Middle Devonian age. The fossil locality is near Ragland, in St. Clair County, and is about 10 feet thick.
		Schohari	Yellow Leaf	?	Quartzitic schist, unfossiliferous, and unknown thickness.
		Oriskany	Jemison	100′	Chert, sparingly fossiliferous.
	Silurian				Apparently absent.
	Ordovician	Chazy	Little Oak	500′	Pure, massive, bedded limestone, mostly dark with light brown streaks. Abundantly fossiliferous, both as to species and individuals.
			Athens	200′	Black, fissile, calcareous shale, with a few thin layers of dark limestone. These beds carry an abundance of graptolites.
		Beekmantown	Newala	1000′	Non-cherty limestone, thin to thick bedded, compact and predominantly pearl-gray in color. Abundantly fossiliferous.
			Longview	500′	Mostly cherty limestone with little magnesian limestone, and sparingly fossiliferous. Not widespread in the region.
	Ozarkian *(Cambrian or Ordovician)*	(Knox)	Chepultepec	1100′	Light gray, massive bedded limestone near the base, and dark blue thick bedded dolomite above, which give rise to cavernous and fossiliferous chert, which is characteristic of the formation.
			Copper Ridge	2000′	Dolomite, light gray, thick bedded and probably siliceous. Weathers down in chert which is composed of microscopic crystals of quartz. This chert characterizes the formation. Carries a few *Cryptozoa.*
			Bibb	?	Probably not represented.
			Ketona	300′	Very pure dolomite. Probably represented, and provisionally identified by Butts south of Anniston.
	Cambrian	Upper	Brierfield	?	Not certainly known but probably not represented.
			Conasauga (Coosa)	500′	Limestone and dolomite, shaly in places, and usually thin bedded. Upon leaching, the beds appear to be shale, preserving the original bedding planes of the limestone. Abundantly fossiliferous.
		Middle	Rome (Montevallo)	1000′	Red and variegated shales and calcareous sandstone, with local lenses of limestone or dolomite. The red shales characterize the formation.
		Lower	Shady (Aldrich or Beaver)	500′	Limestone, sparingly fossiliferous, mostly thick bedded and in part fine grained and approaching a marble which takes a good polish.
			Weisner	2000′	Quartzite or quartzitic sandstone, conglomerates, shale, slate and in places lenses of sandy hematite (gray ore). Apparently unfossiliferous.

The late Eugene A. Smith, at that time State Geologist of Alabama, sent to Packard[12] a brief account of the early mining in this region, writing:

> The mining of bauxite was begun in Alabama in November, 1891, by the Southern Bauxite Mining and Manufacturing Company of Piedmont. Alabama, which has shipped up to date (November, 1892) about 3,600 tons. In July, 1892, the Republic Mining and Manufacturing Company, of Hermitage, Georgia (which is the pioneer in the business), secured a lease of the mines of the Bass Furniture Company, at Rock Run, Cherokee county, and has shipped up to date, about 1,300 tons. In addition to this both companies have several hundred tons under sheds drying out. The ore goes to Philadelphia and Natrona, Pennsylvania; Syracuse, Buffalo, Brooklyn, New York; and other places****
>
> It comes into competition with the ore from Baux in France, which can be purchased at a lower price than that at which this region can furnish it; but it is claimed by the manufacturers that our ore is more soluble, and therefore more valuable, though containing slightly less alumnia. * * * * (Our) alumnia runs from 56 per cent, to 60 per cent average carload analysis. Of the insoluble matter silicia is the chief ingredient. The ore contains from 2 to 3 per cent of titanic acid, and will average from 25 per cent to 30 per cent of water. The ore occurs associated with limonites and kaolins in irregular beds, in the region underlaid by the Knox dolomite of the Lower Silurian formation. In Alabama these occurrences are always near to the foothills of the mountains formed of the Weisner quartzite or sandstone, which is a member of the Cambrian in this State. The bauxite therefore seems to be associated chiefly with the lower beds of the Knox dolomite. The best known occurrences are near Rock Run furnace in Cherokee county, where it has been followed for a few miles towards the Georgia line. This is the only place in Alabama where any systematic mining is done, and this by the two companies above named whose mines are closely contiguous. Near Jacksonville, Alabama, in Calhoun County, the ore has also been discovered, but not yet mined commercially.
>
> The mines are in S. 25, T. 11, R. 11, about 3½ miles northeast of Rock Run furnace and close to the Georgia line. In mining the limonite in one place great quantities of bauxite were moved and lie now in the dump pile. This was before it was recognized as bauxite.

In group 1, the writer has studied and sampled 45 separate ore-bodies (see figure 2), and has attempted to give accurately the location of each. A brief description of each here follows:

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[12] Packard, R. L. Aluminum, U. S. G. S. Min. Res. for 1891, pp. 150-151, 1893.

DeKalb County

1. *Consolidated No.* 1. Mine of the Consolidated Mining Company, 8 miles north of Fort Payne, in S. 10, T. 6 S., R. 9 E. Bauxite forms the core with clay on the border and limonite on the outer rim, (see Figure 17.) The whole mass is covered with debris from associated cherty dolomite. The outer rim carries some debris cemented by limonite, suggesting that the iron was introduced after the bauxite had been formed. This seems to be a large deposit.

About 300 tons of ore were shipped from this mine in 1917-18, to Hamilton, Ontario. From the pit to the cars at Allens, on the A.G.S. Ry., 3 miles distant, was accomplished by wagons at a cost of $1.50 per ton, not counting actual loading.

Analyses[13]

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average white	1-A	3.2	60.8	1.0	2.2	32.8

2. *Consolidated No.* 2. This deposit is about ¼ mile northeast of No. 1, in S. 9, T. 6 S., R. 9 E., and consists of a large area of bauxite drift with widely scattered boulders of ore. The drift may come from several ore-bodies instead of one, but even in that case a comparatively large quantity of ore is probably present.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Boulder	2x	4.7	52.5	10.7	3.5	28.6

3. *Stout.* On land of Sam K. Stout, in S2, T. 7 S., R. 8 E., where a layer of bauxitic clay about 2 feet thick (see Figure 18) is associated with white to black clays. The section through the pit is as follows:

Top—Soil heavily charged with chert
20'—White, sandy clay
4'—Black clay, carrying lignite in pockets and much bituminous matter throughout the layer
2'—Bauxitic clay (see Figure 18)
6'—White and red clays
Bottom—White clay

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[13] All analyses, unless otherwise noted, are by R. S. Hodges, Chemist, Geological Survey of Alabama, of samples collected by the author. These samples are in the collections of the Survey for future examination by anyone who might be interested.

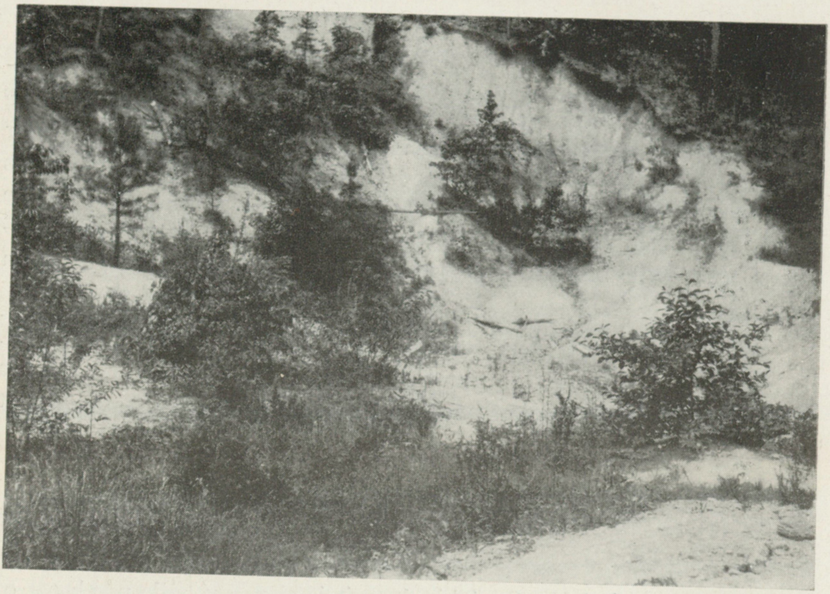

Figure 17:—Consolidated No. 1 Mine, DeKalb County, Alabama.

4. *Ladd.* Located 4.6 miles north of Fort Payne and just west of Wills Creek, in S. 30, T. 6 S., R. 9 E., where a small amount of fuller's earth has been shipped by F. E. Ladd, of Fort Payne. The pit is nearly 100 yards in diameter and apparently a large ore-body is present. No bauxite was seen at this place.

Cherokee County

5. *Terrapin Creek.* Located on the right bank of Terrapin Creek, about one mile northwest of Sanford's Spring, and in SE¼ S. 34, T. 11 S., R. 10 E. It was said that bauxite outcropped in the creek bottom (see Figure 19) but there was too much water at the time to verify this statement. The deposit on the bank had been entered by a prospect hole 26 feet deep, which had gone into a soft ore of very good quality. Around the area are several large boulders of bauxite.

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average hard	5A and B	42.7	39.4	1.7	2.8	13.4
Average soft	5C	14.9	51.0	5.1	2.4	26.6

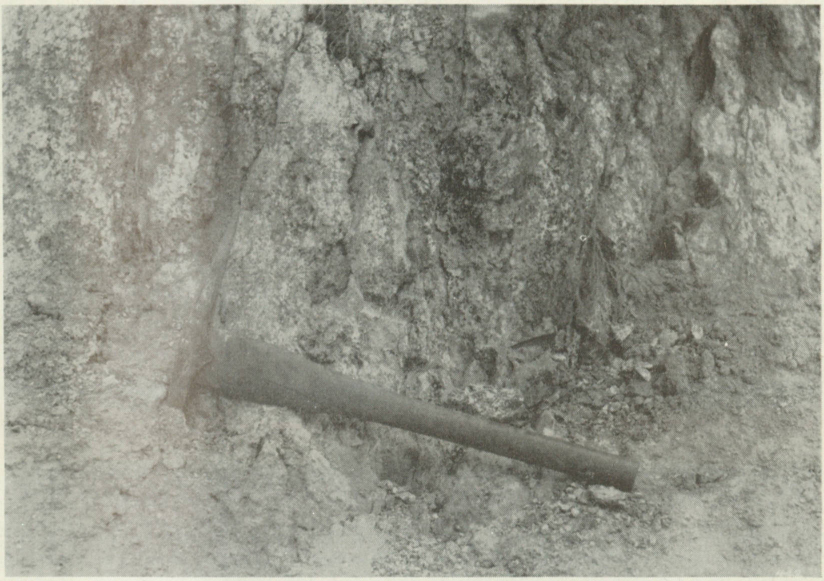

Figure 18:—Bauxitic clay in Stout Pit, DeKalb County, Alabama.

Figure 19:—Bend in Terrapin Creek viewed from bauxite deposit, Cherokee County, Alabama.

6. *Carr or White Bauxite.* In NW¼ S. 25, T. 11 S., R. 11 E., on a hillside near the road. Cuts were driven into the body and some ore was shipped during the early days of mining in the area. In 1912, the White Bauxite Company put in a plant at this place, built a large drying house, but never shipped very much ore. It appeared a case of too much preparation and not enough attention to the matter of mining bauxite. The hard ore at this back is rather siliceous, but is very low in iron.

Near the main cut, a shaft 30 feet deep was sunk into the orebody, and a very nice looking white ore of earthy appearance was found. There appears to be quite a bit of ore left at this place.

Hayes[14] described this deposit:

> The ore body is probably at least 200 feet in diameter, though its outlines can not be definitely determined. The ore is for the most part the oolitic variety, and almost pure white. Most of the oolites are from one-tenth to one-twentieth of an inch in diameter. They are rather loosely imbedded in a soft matrix which only partially fills the intersices. The cavities thus left are lined with a thin film of gibbsite. Under the microscope the ore is seen to contain a large amount of this mineral, which in some cases forms most of the matrix and also replaces portions of the oolites . . . . . The deposit also contains some coarse pisolitic ore consisting of a few rather large simple concretions imbedded in compact white matrix.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average	6 A	31.2	45.1	1.0	2.1	20.6
Boulder	6 X	44.5	37.5	.5	2.2	15.3
Boulder	6 Y	28.2	46.0	1.0	2.0	22.8

7. *Bogan.* SW¼, S. 24, T. 11 S., R. 11 E., across the road from the Carr bank and some 300 yards from the Carr property. The Bogan cut (see Figure 20) was the scene of some activity during the early days of bauxite mining, but apparently the operators did not get out a very large quantity of ore. It was not possible to determine how much ore was left here.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Hand speciment	7 B	11.5	57.9	.8	1.5	28.3

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[14] Hayes, C. A., Bauxite, U. S. Geol. Survey. 16th Annual Rept., pt. 3, 1895, pp. 583.

8. *Estes.* NE¼, S. 24, T. 11 S., R. 11 E., near the State line. The ore at this place (see Figure 21) consists largely of the red, highly ferruginous variety, and the drift from the deposit covers several acres in the vicinity of the pits. A vertical shaft about 6 feet square was driven 30 feet into this ore-body, and was said to be in the same kind of ore all of the way down. This deposit appears to be rather large.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Boulder hard ore	8 X	9.5	53.8	6.0	4.0	26.7

9. *Klondike.* SE¼, S. 23, T. 11 S., R. 11 E. This pit was opened up about 1900 and was worked at intervals until about 1923, and many thousand tons of ore were produced. The pit was about 100 feet deep and 200 to 300 feet in diameter. (see Figure 22). At the present time, water stands within 10 feet of the top of the banks. On the dumps is a tremendous amout of lowgrade bauxite and clay, which sometime may be utilized.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average	9 A	21.2	58.5	1.0	2.0	20.6

10. *Wilson.* SE¼, S. 23, T. 11 S, R. 11 E. This bank (see Figure 23) was characterized by the same type of ore as that in the Klondike, but there were some boulders of hard ore which were composed of unusually large pisolites. The north bank was made up of ore and clay, while a large clay horse occupied a large part of the balance of the pit. A large boulder of red and white bauxite projected out of this clay horse.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Red Streaks	10 Special	15.2	52.4	5.8	2.2	24.4	100.00
White streaks	10 Special	8.2	62.2	.4	3.4	25.8	100.00
Average soft.	10 A	25.6	46.4	.3	2.4	25.3	100.00
"Big eye" hard	10 B	3.2	60.7	.6	3.0	32.0	

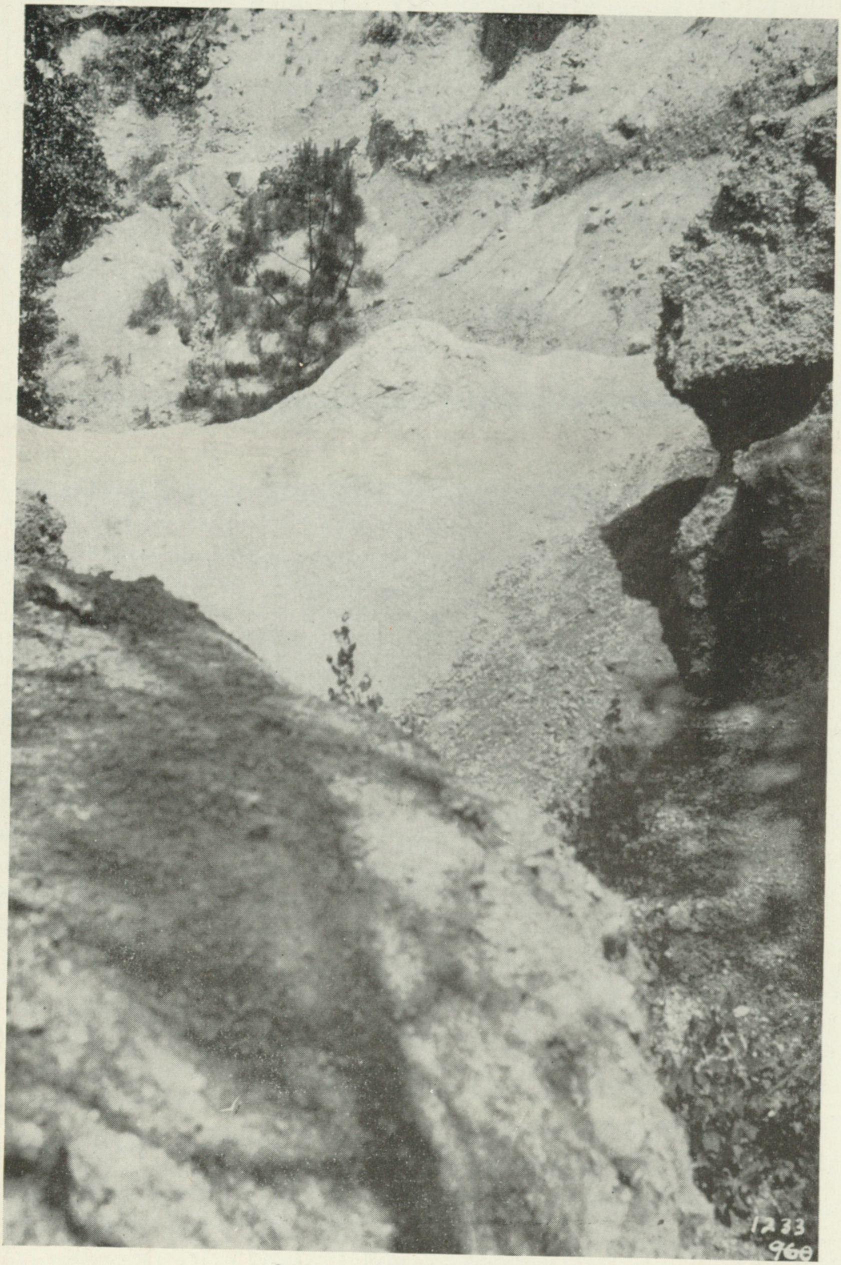

Figure 20:—Bogan cut, Cherokee County, Alabama.

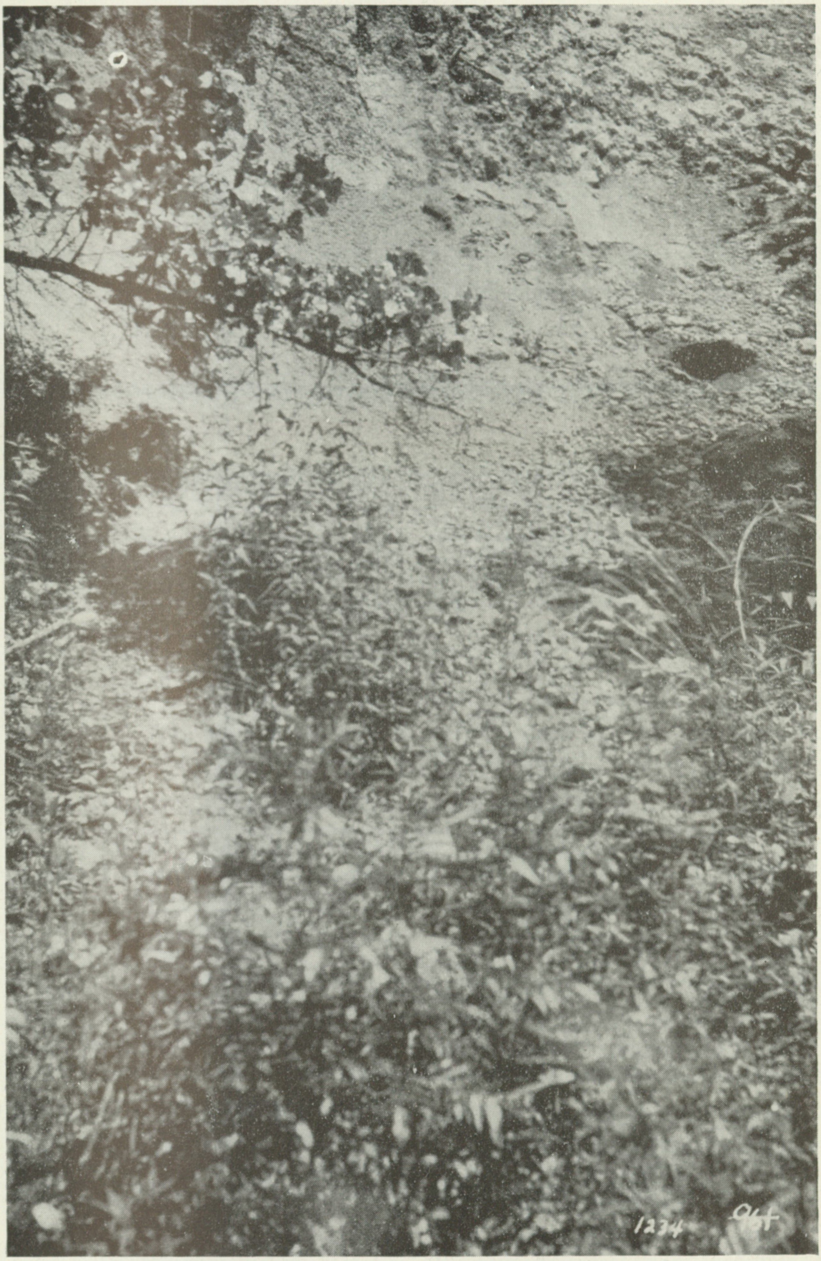

Figure 21:—Estes cut, Cherokee County, Alabama

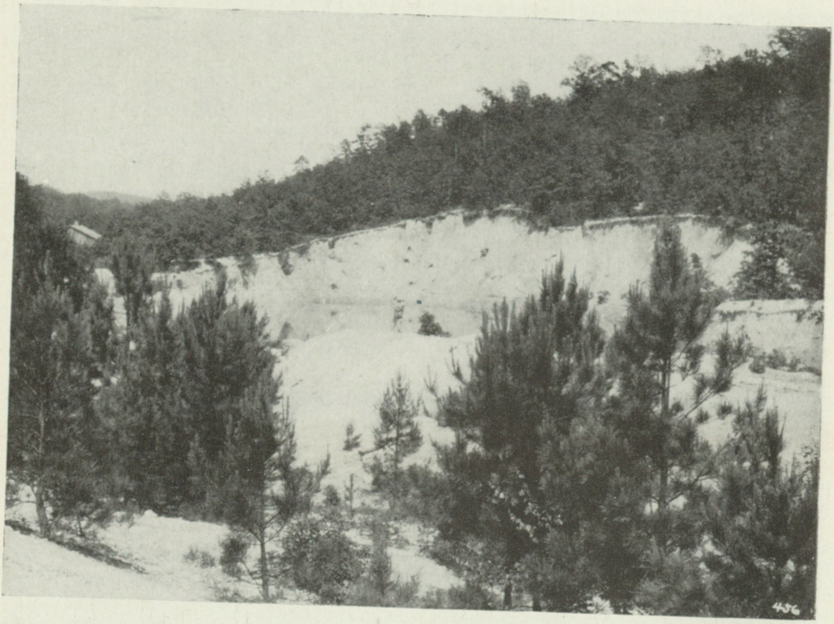

Figure 22:—Looking northeast over Klondike pit, Cherokee County, Alabama.

11. *Hite*. NW¼, S. 23, T. 11 S., R. 11 E. This pit was worked by the Republic Mining and Manufacturing Co., for a number of years, operations ceasing about 1920. Many thousand tons of ore were shipped. The ore consisted largely of soft red and white bauxite, with some hard ore in each grade. Red bauxite composed the outer rim while the interior was largely white, with clay horses scattered about the pit. The banks had caved badly, (see Figure 24) and this was said to have stopped the work.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Soft, red	11 A	31.4	36.6	14.2	2.6	15.2	100.00
Average soft....	11 B	30.1	45.6	.3	2.2	21.8	100.00

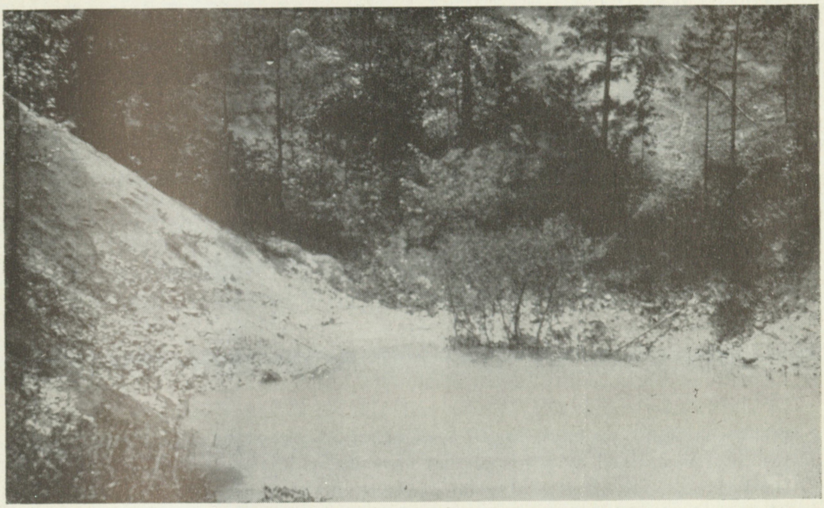

Figure 23:—Wilson Cut, Cherokee County, Alabama.

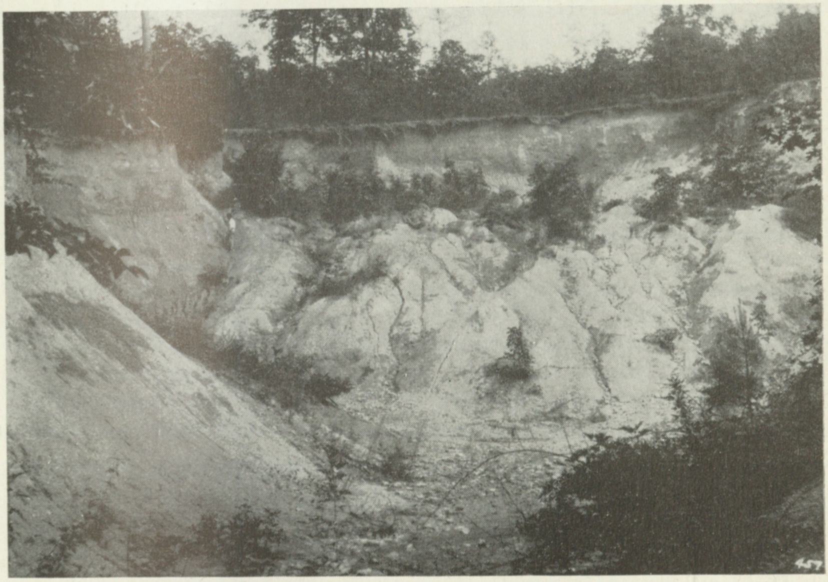

Figure 24:—Looking southeast over the Hite Bank, Cherokee County, Alabama.

12. *Warwhoop.* NW¼, S. 25, T. 11, S., R. 11 E., near the Carr on White Bauxite banks. This pit is about 150 feet wide and some 40 feet deep, with a lead of good ore on the west bank when work stopped. The ore was surrounded by white and red clay, with "burst-ups" of boulders of hard ore in various parts of the pit. This pit was worked by the Southern Bauxite Mining and Manufacturing Company.

McCalley[15] gave a complete description of this deposit:

> "The 'War-whoop Bauxite Bank', about ¼ mile to the northeast of the Gaines Hill Bank, is about in the southwest corner of the NW¼ of S. 25, T. 11, R. 11 E. It is just to the northwest of the outlying low knolls and ridges of the Indian Mountains. It too is owned and worked by the Southern Bauxite Mining and Manufacturing Company. It had reached a depth, on Sept. 12, 1895, of about 20 feet at its back or deepest part. It is drained by a tunnel that runs into a shaft some 20 feet from the bottom. The shaft is dug on one side of the digging. The ores are of several varieties, in irregular patches, that usually gradully pass one another, though they show some stratification. Some of them are full of *eyes* while others have no *eyes* at all, or they range from an amorphorus ore to a coarse pebble ore and from a very soft ore to a hard ore. The change from a soft to a hard ore is very gradual. The different kinds of ore have received the commercial names of the "War-whoop Ore", "Bird's eye Ore", "Purple Ore", "War-whoop Bobo Ore" and "Hard White Ore". The *war-whoop ore,* the main ore of the band is a soft white ore with a dove-colored matrix; the *bird's eye ore* is the *war-whoop ore* with a decomposed matrix, it is inferior in alumnia and is so thrown in the dump pile; the *purple ore* is the *war-whoop* stained presumably with manganese, it is also thrown on the dump; the *hard white ore* has a very white matrix; and the *war-whoop bobo ore* is a soft flour like ore of about the same composition as the *hard white ore.* Along a straight line across the mine, these different ores, according to Mr. R. Swain Perry, Gen. Man. of the Southern Bauxite Mining and Manufacturing Company, once occurred as in the following section, commencing with the top ore:

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[15] McCalley, Henry. Coosa Valley Regions. Ala. Geol. Surv., Special Report 9, pp. 783-785, 1897.

Section across the War-whoop Bauxite Bank

(10)	War-whoop Ore, about	13 ft.
(9)	Bird's-eye Ore, about	8 ft.
(5)	War-whoop Ore, about	10 ft.
(7)	Purple Ore, nearly	3 ft.
(6)	Clay-horse, a little over	3 ft.
(5)	War-whoop Ore, with 3 inches of War-whoop Bobo Ore	3 ft.
(4)	War-whoop Bobo Ore, nearly	3 ft.
(3)	Hard White Ore, nearly	9 ft.
(2)	War-whoop Bobo ore, soft, something over	2 ft.
(1)	Clay, under-bed, white for several feet and then mottled.	

Sample No.	$Si0_2$	Al_20_3	Fe_20_3	$Ti0_2$	Ign	Total	(water, Comb'd)
1		64.68					
2	2.22	58.25	1.50				30.00
3		55.73					
4	0.40	61.87	2.38				30.50
5	2.50	57.00	1.00				29.00
6	2.50	58.00	2.50				30.00

(1) Contains also a trace of manganese monoxide, 0.50 lime, and 4.98 insoluble residue. Analyst—Illinois Steel Company.

(2) Average of hard ore underlying soft ore. Analyst—R. Swain Perry.

(3) Average sample of soft ore over hard ore. Analyst—same as (2)

(4) Average sample of ore shipped May 18, 1892, Analyst—same as (2)

(5) Average of consumers' analyses of between 500 and 1,000 tons of the "hard white ore" shipped in 1893. Analyst—same as (2)

(6) Average of car load samples of War-whoop or putty-colored ore. Analyst—same as (2).

Hayes[16] also gave an interesting account of this deposit:

> A shaft has been sunk on one side of the pit to a depth of 55 feet, and from the bottom of the shaft a tunnel about 50 feet in length runs under the surface workings. This tunnel shows that the ore extends at least 40 feet below the lowest part of the pit.
>
> About 20 feet from the bottom of the shaft the tunnel cuts through a mass of lignite several feet in thickness. This is dark brown or black, with very low specific gravity, and consists largely of finely comminuted vegetable matter containing many small fragments of charred wood. Some rather large pieces of wood retain

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[16] Hayes, C. W., Bauxite. U.S.G.S. Min. Res. for 1894. 16th Ann. Rept. Pt. 3, p. 584, 1895.

their original structure sufficiently for approximate identification. The wood was submitted to F. H. Knowlton for examination. He says of it:

> A very few minute portions were thin enough to permit the structure to be made out. It is undoubtedly coniferous and probably belongs to the genus *Picea* or *Abies;* in other words, it appears to be a spruce. I am not prepared to venture even a guess as to its age.

The lignite is not sharply separated from the clay by which it is surrounded, but passes into it through all graduations from the nearly pure vegetable matter through various stages of carbonaceous clay. Several tons of the lignite were removed in cutting the tunnel, and it has been used as a fuel under the boilers, though with indifferent success.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average ----------	12 B	5.9	59.2	.8	3.0	31.1	
Boulder ----------	12 X	34.2	44.1	1.6	2.4	17.7	

13. *Gaines Hill.* SE¼, S. 26, T. 11 S., R. 11 E. This pit was one of the first in the district to be worked, and was characterized by hard and soft ore composed of large pisolites. The central part of the ore-body was madeup of small pisolitic material similar to that of the Carr banks. (see Figure 25). A horse of purple and red clay projected from the West bank. This pit is about 170 feet by 210 feet and some 30 feet deep. It was operated by the Southern Bauxite Mining and Manufacturing Company.

This deposit has been described by McCalley[17]:

> The Gaines Hill Bauxite Bank is just over the top of the hill some 200 yards to the northeast of the Dyke Bauxite mine proper. It is owned and worked by the Bauxite Mining and Manufacturing Company. It is cut into the hill from the northeast side. The main body of its ore appears to be of a concretionary pocket that is 50 or more feet in diameter. The concentric strata of this pocket are in wrinkles. The greater part of the ore is of the fine pisolitic variety, though some of it is a coarse enough pisolitic ore to be called a pebble ore. An average sample of the coarse ore, with large concretions, gave, according to Mr. R. Swain Perry, the following analysis:

SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
1.75	59.91	2.79		32.15	

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[17] McCalley, Henry. Coosa Valley Region. Ala. Geol. Surv., Special Report 9, pp. 782-783, 1897.

The ore of this bank has some interbedded clay seams and the underlying clay has some irregular bauxite boulders. This underlying clay to the northwest of the ore is a mottled clay and to the south of the ore it is a beautiful white clay with halloysite. These clays are separated from the ore by distinct seams. Next to the ore on the northeast, there is, for some 30 feet in thickness, a large black carbonaceous shaly clay that appears to be of the outer shell of the large concretionary pocket carrying the ore. Over to the northeast of this shaly clay for 25 to 30 feet, to the surface loam, there are quartzites and quartzitic conglomerates that in places extend down into the shaly clay and in other places are weathered into a beautiful yellow sand.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average	13 B	9.3	59.5	1.3	2.3	27.6	
Siliceous	13 B	58.8	25.6	1.2	1.0	13.4	
Boulder	13 X	19.0	52.6	1.3	2.6	24.5	
Boulder	13 Y	7.2	56.2	6.7	2.1	27.8	

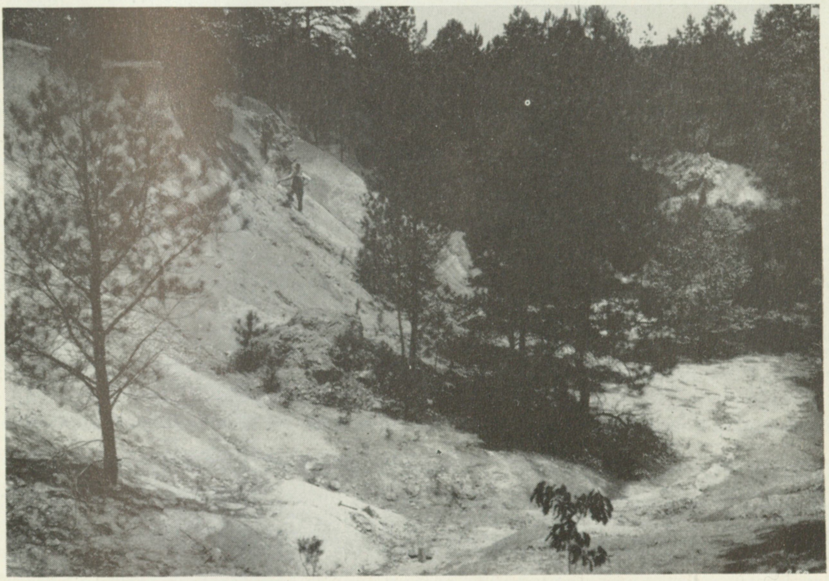

Figure 25:—Looking east over Gaines Hill bank, Cherokee County, Alabama.

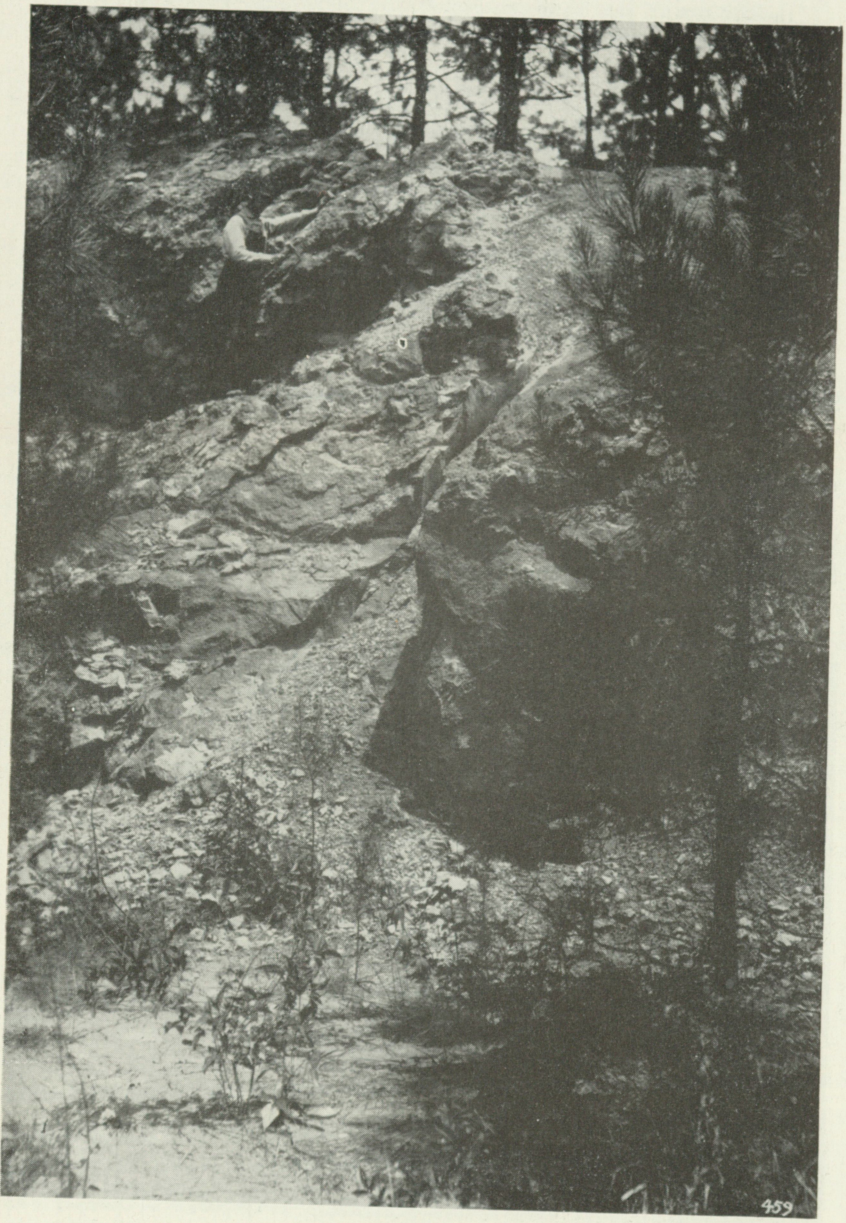

Figure 26:—Close up view of burst-up on east side of Gaines Hill bank, Cherokee County, Alabama.

14. *Tomahawk.* SE¼, S. 26, T. 11 S., R. 11 E. This deposit is now a pit or trench about 300 feet long and an average of some 40 feet wide. (see Figure 27). It is said that about 1,500 tons of merchantable ore were raised, and that it was of the soft variety. The Southern Company mined the west end, while the east end was worked by the Republic Company.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average	14 A	23.3	51.1	.7	1.4	23.5	
Average Pink Soft	14 B	2.9	61.2	.5	3.6	31.8	

15. *Tierce.* SE¼, S. 26, T. 11 S., R. 11 E. This bank (see Figure 28) was formerly worked for brown ore, before the discovery of bauxite in the area. The ore is largely chalky, a little weakly pisolitic and some hard compact. Most of it is light in color. It is said that a lot of ore was raised here and that it was of good quality.

16. *Burst-up.* SE¼, S. 26, T. 11 S., R. 11 E. This Burst-Up is one of the largest pits in the district, some 300 feet in diameter and 110 feet deep.. The writer was informed that 14,000 tons of ore were taken from this bank. It was closed down about 1920. When the operations closed, there was still in the pit a wall of ore 40 feet high and 80 feet wide and test with a tunnel 36 feet deep. It was estimated that there were 10,000 tons in that wall alone. The pit was too deep for the safety of the workmen as the walls were insecure and timbering would have been too expensive.

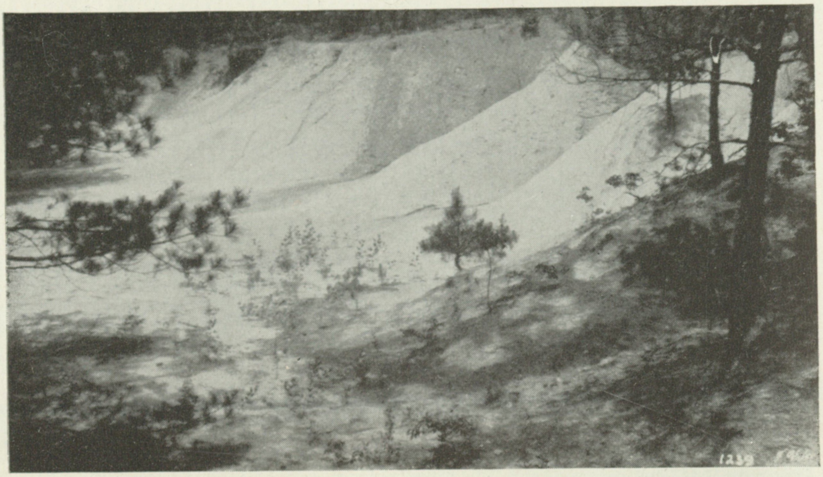

Figure 27:—West end of Tomahawk mine, Cherokee County, Alabama.

McCalley[18] gives an interesting account of the pit:

"The Burst-Up Bauxite Bank is some 200 yards to the southeast of the "Dyke Bank proper". Its ore also shows a distinct stratification and appears to be moundshape from the intersection of two wrinkled waves with respectively northeast-northwest and northwest-southeast trends. It has been dug down into a depth of from 20 to 30 feet and so far as exposed appears to be in two irregular seams that are separated from each other by a very irregular seam of unctuous clay of white, blue, and mottled colors. The upper ore seam has a maximum thickness, on the outcrop, of some 30 feet, and the under seam has been dug down into a depth of some 20 feet without getting through it. Neither of these seams, however, are believed to be as thick as they appear to be on the outcrop. The lower one has in it some spots of bauxitic clay and some streaks of manganese stain. The following analysis, given by Mr. John H. Hawkins, Supt. of the Republic Mining and Manufacturing Company, are said to be of average samples of respectively the white and red ores of this bank:

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
	(1)	2.90	58.21	3.60	3.40	31.89	
	(2)	8.99	40.93	22.60		20.43	

"This bank is not now being worked and so its ore is becoming covered up by debris."

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[18] McCalley, Henry. Coosa Valley Region. Ala. Geol. Surv., Special Report 9, pp. 778-779, 1897.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average red	16 A	5.4	56.2	6.4	3.0	29.0	
Average siliceous	16 B	16.2	55.9	1.0	1.6	25.3	
Average soft	16 D	2.0	63.5	1.7	3.7	29.1	
Average siliceous	16 E	16.3	53.5	.7	3.0	26.5	
Boulder, red	16 X	6.9	54.3	8.3	3.5	27.0	
Boulder, siliceous	16 Y	17.7	53.8	1.1	2.6	24.8	
Boulder, cherty	16 Z	44.9	37.6	.9	2.6	14.00	

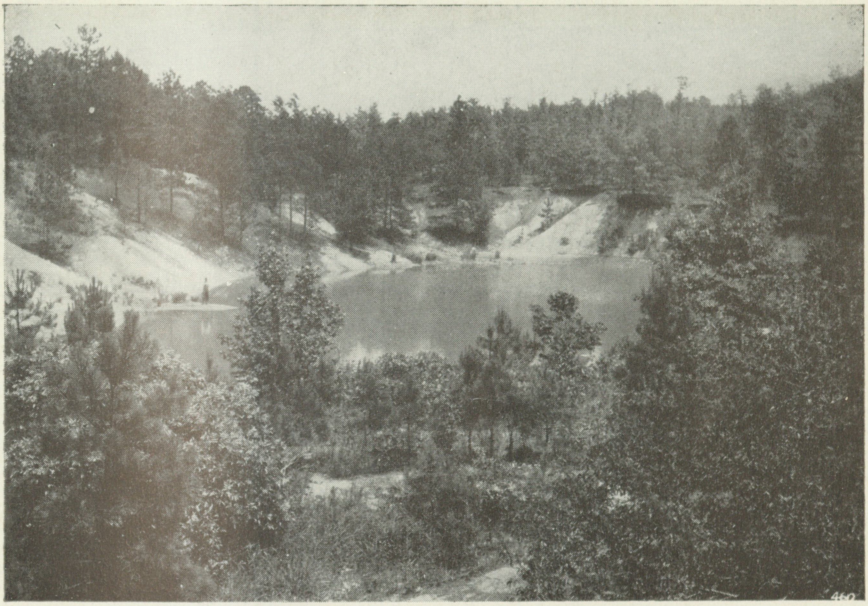

Figure 28:—Tierce Cut, Cherokee County, Alabama.

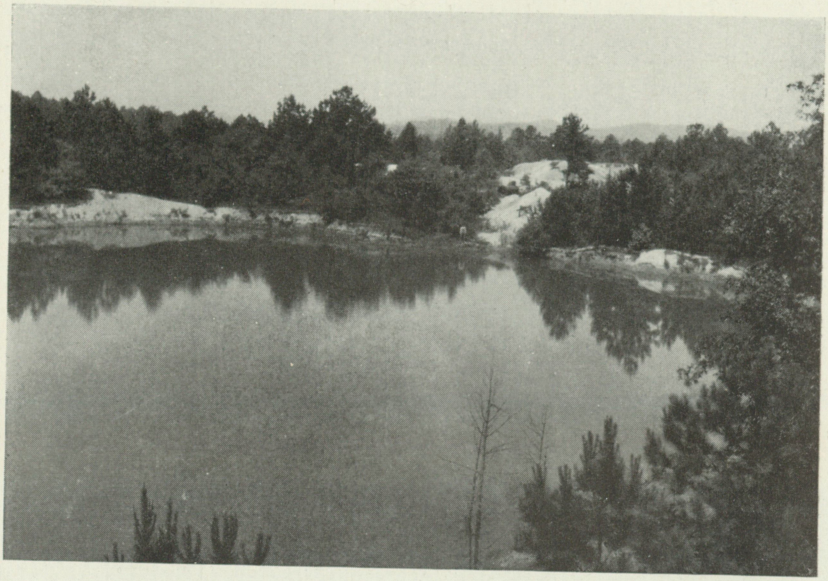

Figure 29:—Looking west over Burst-Up banks, Cherokee County, Alabama.

17. *Dyke* (*Sep*). SE¼, S. 26, T. 11 S., R. 11 E. The discovery bank, perhaps the largest in the area, was worked for limonite many years before the "iron ore blossom" was identified as bauxite. The old brown ore pit was 600 feet long, 225 feet wide and from 30 to 75 feet deep (see Figure 30). The writer found iron ore at the top, followed downward by highly ferruginous, "big-eye" bauxite, then red and white hard ore and finally the high grade bauxite, of the soft, pisolitic type. At that time, the pit was about 375 feet in diameter and 110 feet deep. The ore-body was kettle shaped with practically no clay horses. It is estimated that some 20,000 tons of ore were taken from this pit.

This deposit has been described in detail by McCalley[19]:

> The northwest side of the digging is of a white clay-horse of a very pure white potter's clay with pinkish or ferruginous shaly spots, and with pockets of a very black rotton lignite that burns with a strong bituminous smell. The bottom or floor of the digging is partly of a bluish quartzite that in places becomes white and friable on weathering. This quartzite looks very much like that at the top of the (a) Weisner (Chilhowee) Sandstones. It is in steep wrin-

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[19] McCalley, Henry. Coosa Valley Region. Ala. Geol. Surv., Special Report 9, pp. 777-778, 1897.

kles and small waves with a northeast and southwest trend, as are the beds of overlying clay and ore. The northeast end of this digging is a large deposit of bauxite, the "Dyke Bauxite Bank proper." That appears to take the place of the white potter's clay or to come in under the limonite and over the quartzite. The covering to the limonite is a mullatto loam with, in places, loose quartzites.

"The "Dyke Bauxite Bank" is the newest or the last to begin to be worked of the bauxite deposits of the "Dyke District", though its ore was exposed in the mining of the limonite some years ago, before its value was known or when it was known as "iron ore blossom." This bank is owned and worked by the Republic Mining and Manufacturing Company. Its ore, on Sept. 12, 1895, had been dug down into a depth of 20 feet or more. It shows a distinct stratification, though it is doubtless in an irregular pocket. It appears to be of mound-shape from the intersection of two wrinkled waves or anticlinals with respectively northeast-southwest and northwest-southeast trends, on the southeast side of a large unsymmetrical anticlinal. Its ore stops suddenly on the southwest or towards the limonite bank at a water seam with a northwest and southeast direction, though, to the northeast of this seam for 30 to 40 feet, the beauxite is in places badly mixed with clay. It is also mixed with clay in places away from this seam to a depth of 6 to 8 feet below the surface. In these latter places, the ore occurs as detached boulders in a mottled clay. The body of the ore has in it also some irregular patches of clay and clayey bauxite, though it, as a whole, has a more uniform composition than any other known bauxite deposit. Its ore is principally of the amorphous and fine pisolitic varieties. There is no telling its extent. It is most probably connected with that of an outcropping some 30 to 40 yards to the northeast and it may be connected, across a synclinal trough, with that of the "Burst Up Bauxite Bank" some 200 yards to the southeast.

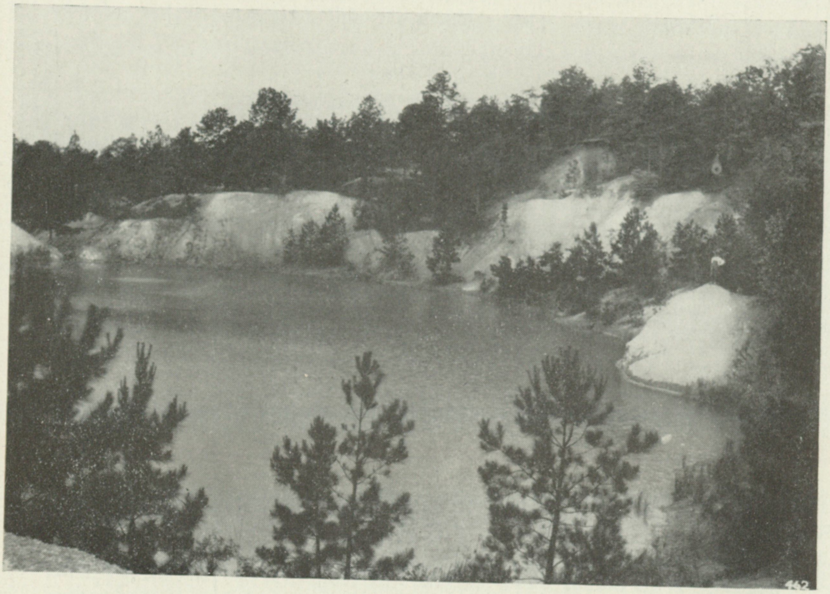

Figure 30:—Old Dyke Cut, Cherokee County, Alabama.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Boulder, red	17 X	5.3	40.1	32.2	1.3	21.1	
Boulder, red	17 Y	7.6	53.6	9.4	2.1	27.3	
Average	17	14.6	55.6	.3	2.8	26.7	100.00

18. *Indian Dyke.* SE¼, S. 26, T. 11 S., R. 11 E. This pit is some 100 feet wide and somewhat longer than wide, and perhaps 30 feet deep. From all appearances, it has been mined out. It was shut down about 1914. The ore was high grade.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average soft	18	5.7	60.0	2.7	29.6		

19. *No. 138 A and B.* SE¼, S. 26, T. 11 S., R. 11 E. Two openings, neither very large, carrying a mixture of material much of which was not bauxite. It is doubtful if any ore was ever shipped from either place.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Bauxite	19 B #1	12.2	54.1	1.2	2.6	29.9	
Clay	2	42.3	38.5	.2	Trace	19.0	
Bauxite	3	8.9	60.0	1.2	2.4	27.5	
Do.	4	20.5	52.6	.4	2.6	23.9	
Do.	5	22.2	51.4	.4	2.4	23.6	
Do.	6	6.4	57.8	1.4	4.2	30.2	
Clay	7	42.7	37.1	3.0	3.8	13.4	
Bauxite	8	22.2	50.0	1.8	1.8	24.2	
Clay	19 A	41.0	40.5	.5	2.4	15.6	
Do.	19 B	42.7	40.3	.8	1.8	14.4	

20. *Pine Cut.* SE¼, S. 26, T. 11 S., R. 11 E. This is another small pit, from which about 100 tons of good bauxite were raised. The cut is about 60 feet in diameter and some 30 feet deep. The ore was largely the hard, white variety.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average white	20	3.5	62.6	.9	2.2	30.8	
Average hard	20X	2.8	61.7	1.4	4.0	30.1	

21. *Red Cut.* SE¼, S. 26, T. 11 S., R. 11 E. From a standpoint of association of iron and alumnia, this pit carries much of interest. However, it is doubtful if more than 50 tons of good bauxite were ever shipped from this place. At this place, even the iron ore shows pisolitic character, although it is very hard and compact. The material is a splendid example of the intimate relationship between the iron ore and bauxite.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Boulder, red	21 S	13.7	21.3	51.5	2.2	11.3	
Boulder, limonite	21 X	16.5	13.5	58.4	3.8	7.8	
Boulder, red	21 Y	12.2	55.9	3.6	1.5	26.8	
Boulder, red	21 Z	14.1	23.4	48.0	2.9	11.6	

22. *New Dyke.* SE¼, S. 26, T. 11 S., R. 11 E. This ore-body had from 10 to 15 feet of cover, and was some 300 feet long by 150 feet wide and about 90 feet deep when abandoned. The ore consisted of hard and sofe white ore, both pisolitic and chalky. A small amount of ore was left in the bottom. The banks are made up of white, yellow, buff and red clays. The ore from this pit was of fine quality.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average soft ----	22 A	1.9	62.7	.7	2.0	32.7	
Boulder, Red ----	22 X	6.5	52.6	10.4	3.7	26.8	

23. *Outcrop.* NE¼, S. 35, T. 11 S., R. 11 E., and just across the section line from the New Dyke cut. This place never passed the prospecting stage, but some pretty fair bauxite was uncovered. Most of the ore appeared to be red, with some white, all pisolitic.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average white ----	23	15.4	54.7	1.3	2.5	26.1	

24. *Washer or Taylor.* SW¼, S. 35, T. 11 S., R. 11 E. This pit is about 250 feet in diameter and about 90 feet deep, (see Figure 31) and was one of the large ore-bodies of the district. The good ore as mined and shipped was white and red, pisolitic, both hard and soft. Water was kept out of this pit by a tunnel, (see Figure 32) and it is fairly dry inside. From the quantity of good ore on the dumps, the company must have been after the very highest quality material. At the time of the writer's visit, some ore still remained in the bottom and in the west bank.

This mine was abandoned about 1909, and was described in detail by McCalley.[20]

> The "Washer or Taylor Bauxite Bank" is just to the southeast of the "Washer or Taylor Limonite Bank." It is something over ¼ mile to the southwest of the Dyke Bank or is in the S.W. ¼ of

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[20] McCalley, Henry. Coosa Valley Region. Ala. Geol. Surv., Special Report 9, pp. 779-782, 1897.

S.W. ¼ of S. 35, T. 11, R. 11 E. It is on the property of the Bass Furnace Company and is worked by the Republic Mining and Manufacturing Company. It is not worked now because of the caving in of its sides. The digging is driven into the foot of a spur or outlier of the Indian Mountains and at its southern or back end is some 75 feet deep. It is drained by a tunnel some 600 feet long that starts in at the foot of the hill. Its ore appears to be of a very irregular deposit and little can be said with certainty as to its extent. It is however well defined by walls of clay. It is said to have been continuous in the floor, though the slides have covered the ore of the floor and partly that of the sides. As it now shows in the sides of the bank, however, the ore of the front and back of the digging are separated by a *clay horse-back* that is of stratified clay that appears to be of the crest of a wave or anticlinal, with an east and west trend, and to go under the ore on each side. . . . .

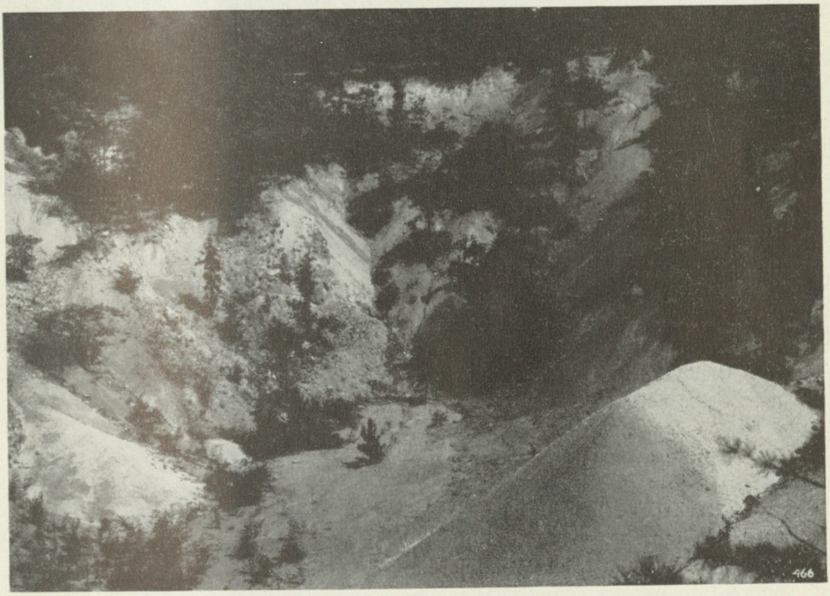

Figure 31:—Looking southeast over Washer bank, Cherokee County, Alabama.

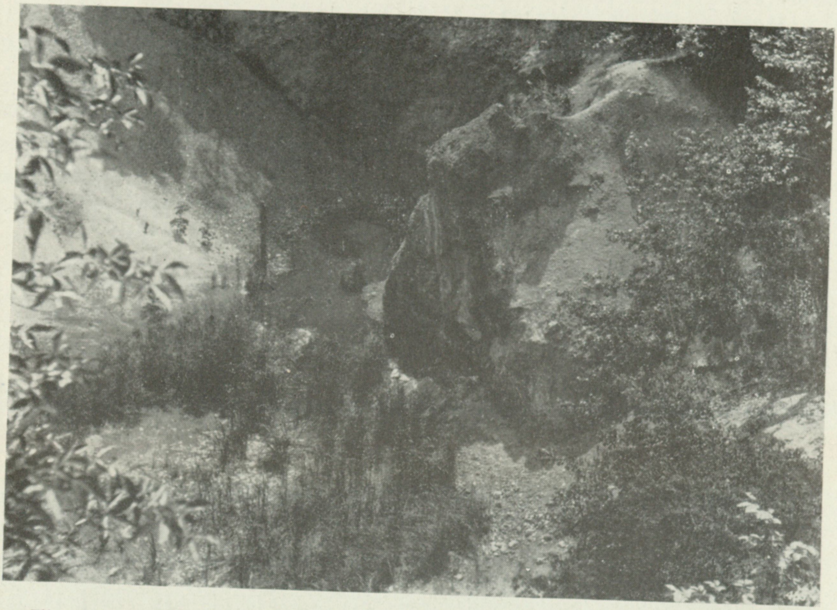

Figure 32:—Looking west over Washer bank, showing red ore and tunnels, Cherokee County, Alabama.

The ore, though it is believed to be in a very irregular pocket, shows a distinct stratification that is in waves and wrinkles with a northeast and southwest trend. It is of almost every variety, though it is mostly pisolitic and, as a whole, is of very good quality. The upper 20 feet of white and cream colored ores with small pisolites is the best ore, with the exception of an interbedded seam from 4 to 5 feet thick. This best ore is in places hard and firm enough to have a metallic ring. The lower ore is mostly a very coarse pisolitic ore, often coarse enough to be called a pebble ore. In some of it, there are bauxite concretions as large as half-barrels. The lower ore is in places also a pisolitic bauxite clay and in other places it has one or two interbedded layers of hard flinty nodules with a conchoidal fracture. When these flinty nodules become too numerous, the ore has to be discarded. Some of the bauxite clay is also hard and firm enough to have a conchoidal fracture and metallic ring.

The eyes of the ore of this bank are stained red and are often filled with a loose red siliceous powder. The following analyses are of the ores of this bank.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
	(1)	4.55	58.53	1.12		38.20
	(2)	2.10	61.58	1.20		31.45
	(3)	2.10	61.00	2.20	3.12	31.58
	(4)	2.90	58.21	3.60	3.40	31.89
	(5)	4.52	53.87	8.16		24.86

(1) A medium hard ore that is full of soft pink colored *eyes,* concretions. Analyst:—H. B. Cristiansen.

(2) An average sample of the ore with large red *eyes.* Analyst:—Same as (1).

(3) A white uniform ore with only a few *eyes.* The *eyes* are slightly colored. Analyst:—Same as (1)

(4) A nearly white ore with small red *eyes.* Analyst:—Same as (1).

(5) Given by Mr. John H. Hawkins, Supt. of Republic Mining and Manufacturing Company, as about an average analysis of the ores of this mine.

The cover to this ore is an unctuous clay of red and mottled colors. The mottled clay reminds one in looks and feeling of castile soap. These covering clays carry some large angular masses of coarse pisolitic bauxite. Between the clay and bauxite, both over and under the bauxite, there are well defined water seams. The different kinds of clay like the different kinds of bauxite, are in irregular patches or pockets. The drainage tunnel at its head, and for some 200 feet back, is said to have been in or on a bituminous shale or lignite that becomes dingy on exposure, though it readily burns, leaving but little ash.

To the southwest of this bank for some 200 yards, there is a fine surface showing of a deep red bauxite that resemble old under-burnt bricks, and to the northwest of it some 150 yards, in the "Washer or Taylor Limonite Bank", there are some large boulders of bauxite.

An additional sample of ore was collected by W. B. Jones and and an analyses by R. S. Hodges yielded the following:

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
		12.6	56.0	1.0	4.0	26.1

25. *Murnaghan.* SW¼, S. 35, T. 11 S., R. 11 E. This is another of the large pits of the district, and is 360 feet long, some 285 feet wide and 110 feet deep. The characteristic ores of this body were white pisolitic and a blue, chalky variety, both very high grade. When the pit was abandoned in 1919, there was a quantity of ore left in the bottom and in the lower part of the northwest wall. The discovery of this ore-body was effected through the presence of a few white pisolites on the surface, near some old brown ore workings. There was no "burst-up" which was characteristic of nearly all of the rest of the deposits of this area. Mining began about 1900 and a large quantity of ore was raised.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average blue	25 A	3.6	61.1	.6	2.8	

26. *Red Shaft.* SW¼, S. 35, T. 11 S., R. 11 E., near the township line. This pit is a prospect only, with hard, red ore predominating and a smaller amount of hard, white bauxite, both pisolitic. At the time of the writer's visit, it appeared that the white ore was high grade, which is another reason why opinion should not be expressed regarding the quality of bauxite (see analysis of average white).

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average white	26 A	44.8	39.0	.7	.8	14.7
Boulder, red	26 X	3.6	43.8	27.5	2.9	22.2

27. *Red Washer.* SW¼, S. 35, T. 11 S., R. 11 E. Similar in every way to the ore at the Red Shaft, but the red ore appeared to be a little better. The mine is about 75 feet long, 40 feet wide and from 35 to 40 feet deep. There is a good lead of ore in the northwest bank, and a lot in the dumps.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average red	27	2.1	51.2	16.5	3.5	26.7

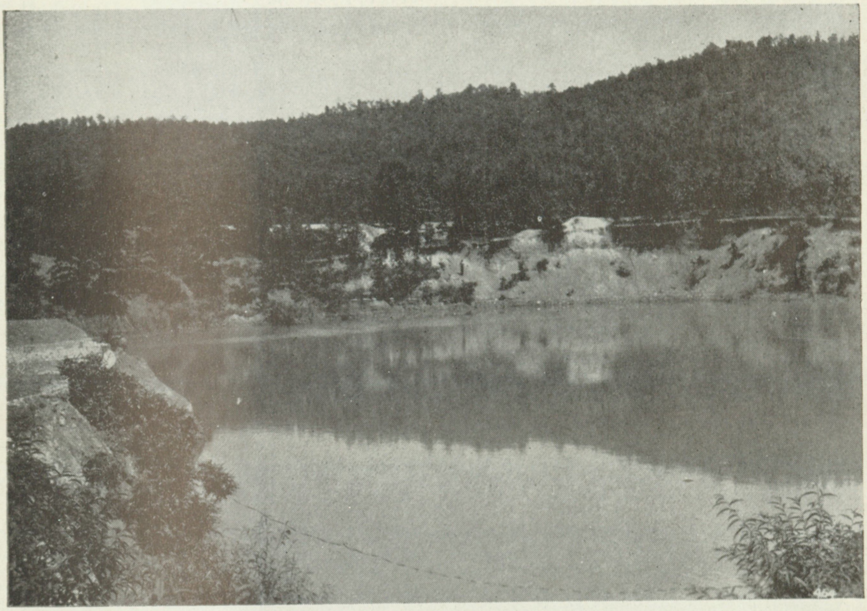

Figure 33:—Looking southeast over the Murnaghan cut, Cherokee County, Alabama.

28. *Stubbs Hill.* SE¼, S. 28, T. 11 S., R. 11E. This pit was opened in 1918 and was operated about a year. The quality of the ore was not very good, and there probably is not much left in the mine. It is exceedingly interesting, however, from the association of bauxite and other materials.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Average pink	28 A	21.8	51.3	1.8	2.5	22.8	
Average white	28 C	28.1	48.3	1.0	2.2	20.4	
Pebbles	28 D	21.9	22.0	44.3	2.2	9.6	100.00
Boulder, white	28 Y	3.5	62.2	1.1	2.0	31.2	

29. *Snyder* (*New Goshen*). NW¼, S. 7, T. 12 S., R. 10 E. This mine (see Figure 36) was worked for about 18 months, about 1905-06, by the Dupont Company. The pit is some 110 feet long, 50 feet wide and about 40 feet deep. All of the sides are composed of red and white bauxite, mostly soft pisolitic, and it is reported that there is good bauxite in the bottom.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average white	29 B	1.9	61.3	1.4	2.4	33.0
Boulder, red	29 X	6.6	50.6	14.3	3.0	25.5

30. *New Stewart*. NE corner S. 7, T. 12 S., R. 10 E. It is reported that some ore was raised here, but it is quite evident that the quantity was small, for the ore-body is not a large one. The pit is 30 feet in diameter and 15 feet deep, and was opened up in 1895.

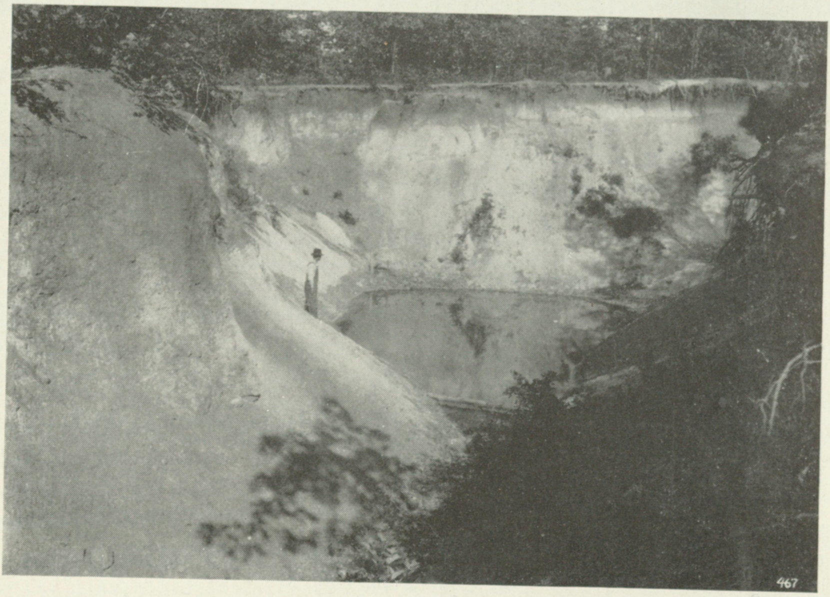

Figure 34:—Stubbs Hill bank, looking northeast, showing bauxite and bauxitic clay in left and center bank except at extreme left where pebbly iron and manganese ore shows up, Cherokee County, Alabama.

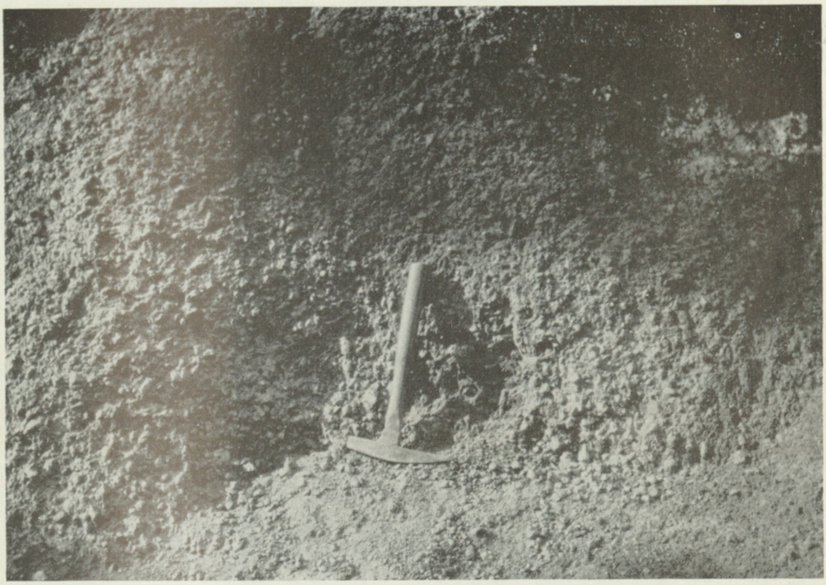

Figure 35:—Close up of Pebbly iron ore showing up at extreme left of Figure 34, Stubbs Hill bank, Cherokee County, Alabama.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Boulder, white	30 X	4.6	59.9	1.7	3.3	30.5

31. *Old Stewart.* SE corner, S. 6, T. 12 S., R. 10 E., and about 200 yards west of north of the New Stewart cut. This pit was opened and abandoned when the New Stewart was found, on account of water. The ore seems to be good, mostly of the soft white, pisolitic type, with some hard ore. The latter is rather cherty. Headward erosion in the pit has uncovered a bank of bauxite 12 feet high and 30 feet wide.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average soft	31	14.9	54.8	1.2	1.2	27.9

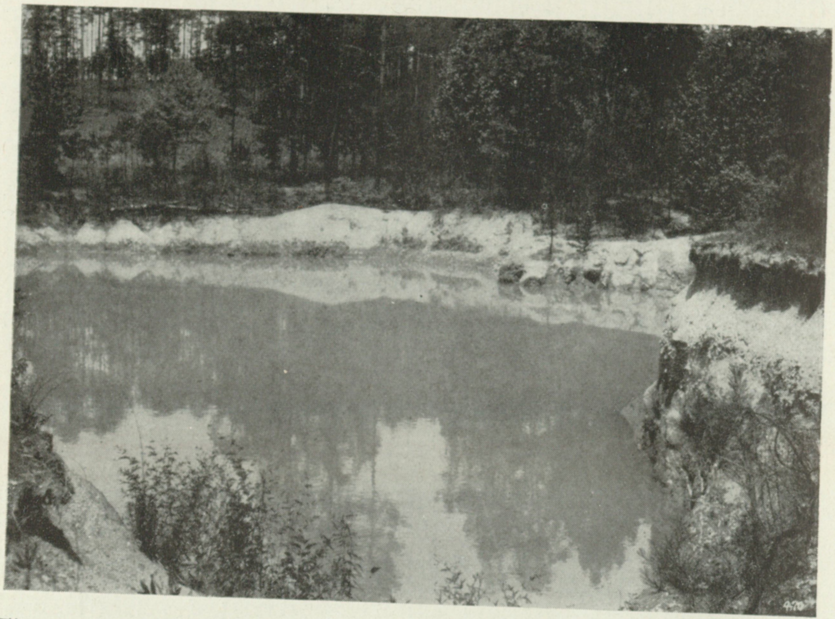

Figure 36:—Looking northwest over the Snyder cut, Cherokee County, Alabama.

32. *Cowan.* NW¼, S. 13, T. 12 S., R. 9 E. This place is in reality a prospect, with bauxitic clay showing up in two places.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Pisolitic limonite	32 B	2.8	4.5	82.8	5.6	4.3

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Average, red	32 A	3.1	56.8	9.4	1.5	29.2
Ferruginous	32 C	2.8	41.1	30.5	3.0	22.6
Siliceous red	32 D	38.3	31.2	16.3	2.4	11.8

33. *Rumsey.* NW¼, S. 14, T. 12 S., R. 9 E. This place was the scene of prospecting about 1895, when a few shallow test pits were dug. The soil is sprinkled with high grade limonite pebbles, but there was not much bauxite in evidence.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
Hard white	33 A	11.9	57.4	.7	3.2	26.8
Sandy clay	33 B	66.5	24.1	.6	1.5	7.3

34. *Lee No.* 1. SW¼, S. 14, T. 12 S., R. 9 E., about 300 yards north of the Wade Cobb house. Several pits and trenches were dug here, and a small amount of low-grade ore pitched out. Most of this is white, buff and red, and is hard and weakly pisolitic.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Hard, white	34 A	15.5	56.4	.3	1.6	26.2	100.0

35. *Lee No.* 2. SW¼, S. 14, T. 12 S., R. 9 E., about 200 yards north of the Wade Cobb house. This place was prospected by the Dupont Company, and the work consisted of a net-work of trenches. Some very good ore was encountered and it is said that they were ready to ship when the lead suddenly ran out.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Clay	35 A	48.6	35.9	.4	.8	14.3	100.0

Calhoun County

36. *Windom or Walker.* SE¼, S. 12 S., R. 8 E. According to Mr. Dan Privett, who accompanied the writer to this place, a shaft was sunk into this ore-body, and showed bauxite all the way down, with white ore in the bottom. The upper part was hard white and the balance soft, all pisolitic. The top drift carries both white and red boulders.

McCalley[21] has described this deposit as follows:

> Bauxite has been exposed in several shallow test pits a short distance to the northwest of the Windom Bank. These pits are within a distance of about 250 yards in a general northeast and southwest direction. They are not deep enough to show much as to the quantity and character of the ore. In one of them, the ore is exposed to a thickness of 12 to 14 feet and in another to a thickness of about 25 feet, though in neither of these pits is it exposed to its full unknown thickness. They show both red and white ore and in both pits the white ore seems to be on top and the red ore the thicker. The matrix is a straw colored sandy loam. These pits appear to be along the top or nothwest side of an anticlinal. Some of the pisolitic concretions are full of a fine ferrugineous dust while some of them are empty. This ore, as it shows here on the outcrop, is not of the best quality. The most of it is too siliceous and some of it is very high in iron, as can be seen from the following analyses:

Analyses

Sample Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign
(1)	18.87	45.94	11.86		21.20
(2)	7.73	47.52	19.95		23.57*
(3)	23.72	41.38	0.85		23.72*
(4)	10.25	41.00	25.25		21.97*
(5)	21.08	48.92	2.14		23.86*

*These include the hydroscopic moisture.

(1) An average of two analyses of the red ore on the outcrop. Analysts:—R. Swain Perry and Chemist of the U. S. Geological Survey.

(2) An average of two analyses of the white ore on the outcrop. Analyists:—Same as (1)

(3) An average sample of the ore on the outcrop. Analyst:—W. B. Phillips.

(4) The red variety. Analyst:—Same as (3)

(5) The white variety; Analyst:—Same as (3) and (4).

37. *Outcrop.* NW corner, S. 14, T. 14 S., R. 8 E., in the edge of Jacksonville, and on property of J. F. Crow. This outcrop shows quite a sprinkling of white bauxite and loose "buck-shot" in the soil, but has not yet been prospected. The level of this deposit is about 100 feet below No. 36.

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[21] McCalley, Henry. Coosa Valley Region. Ala. Geol. Surv., Special Report 9, pp. 720-721, 1897.

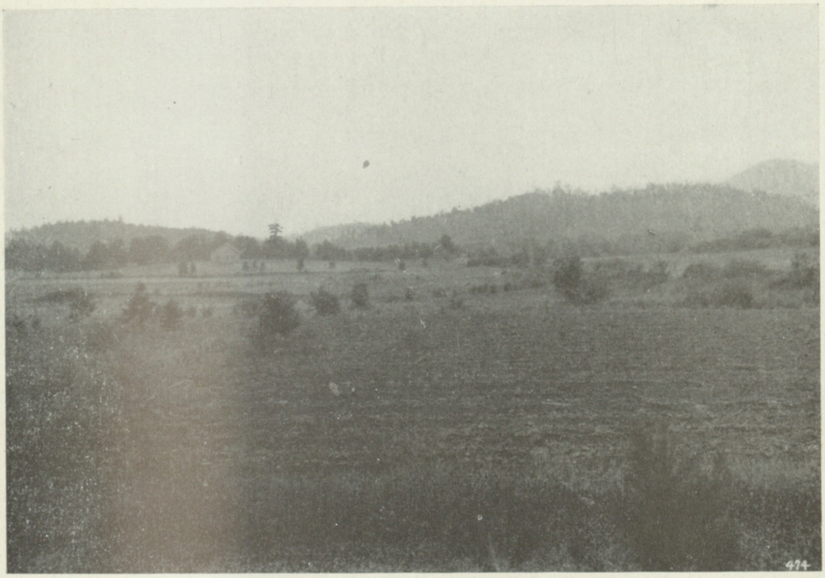

Figure 37:—Looking north over the site of the Windom pit, Calhoun County, Alabama.

38. *Love Cut.* SE¼, S. 16, T. 14 S., R. 9 E. The outcrop at this place is on the top of a narrow ridge some 100 feet wide, with a northeast-southwest trend. It has not been thoroughly prospected, but shows promise of some gretty good ore. The main "burst-up" is in a grave-yard on top of the hill, and consists of straw-colored and red boulders, some of which are high in iron content. The prospecting was done by Dan Privett in 1891, for the Seaboard Air Line.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Boulder, red	38 X	3.6	39.6	29.2	2.2	25.4	
Boulder, red	38 Y	5.1	52.4	15.6	2.5	26.4	

39. *Camp McClellan.* This is about ¼ mile south of Lloyd's gap and some 3 miles northeast of Anniston, on the Camp McClellan Military reservation. The ore-body outcrops at the surface, and consists of highly siliceous bauxitic clay, very white and pisolitic. The surface drift covers about half an acre.

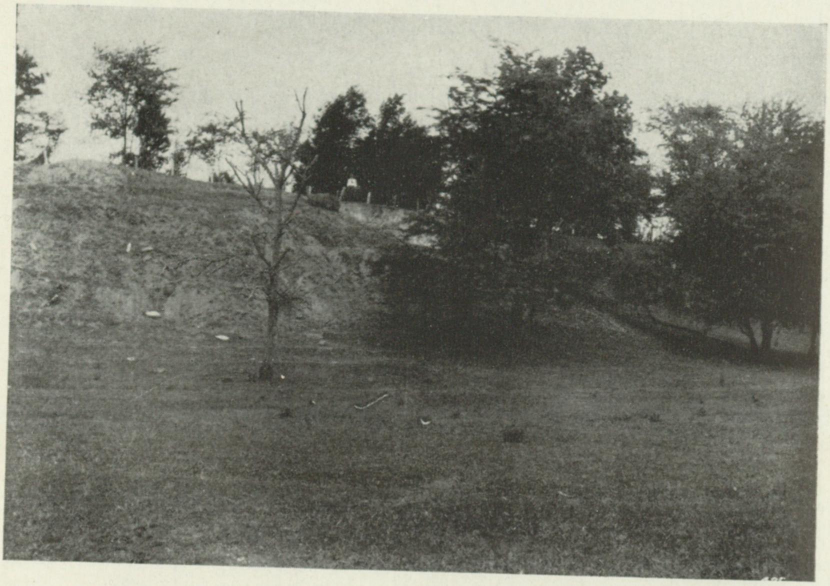

Figure 38:—Looking west over the Love Cut, Calhoun County, Alabama.

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Boulder, white ..	93 X	45.7	38.1	.5	1.7	14.0	

40. *Dothard*. Northwest corner, S. 3, T. 14 S., R. 9 E., near the Jenkins settlement. Rather extensive outcrop and possibly represents two ore-bodies. The ore appears to be sandy, but an opinion should not be put forth until unweathered material was available for examination.

41. *Bordon*. SW corner, S. 33, T. 13 S., R. 9 E., just across the township line from No. 40. Outcrop represented by loose bauxite mixed with the soil, and no test pits.

42. *Outcrop*. SW¼, S. 33, T. 13 S., R. 9 E., in lands of the Alabama Mineral Land Company. The drift from this deposit, which is white bauxitic clay, pisolitic both hard and soft, covers at least 40 acres. An old pit had been dug into this deposit, but there was not much evidence remaining.

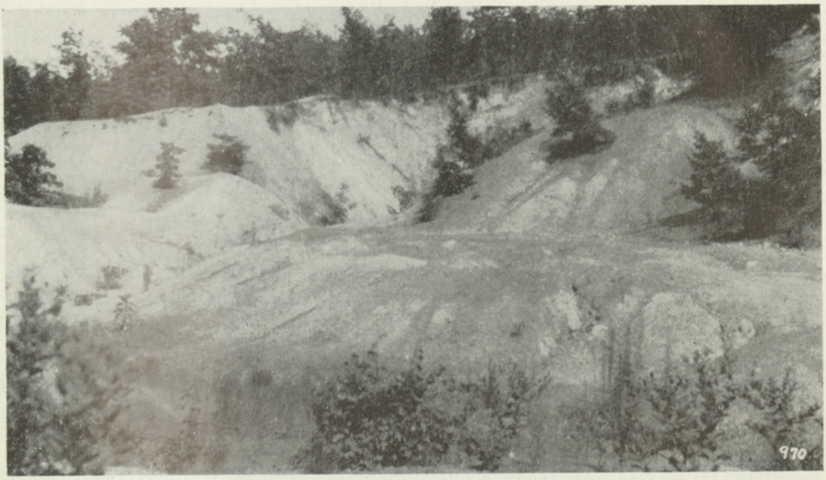

Figure 39:—White bauxite in the Skinner brown ore bank, Calhoun County, Alabama.

Analyses

Sample	Number	$Si0_2$	Al_20_3	Fe_20_3	$Ti0_2$	Ign	Total
Average soft	42	44.6	37.5	.5	3.5	13.9	
Boulder, hard	42 X	44.4	37.8	.5	3.5	13.8	

43. *Skinner Ore Banks No.* 1. Located one mile southwest of Anniston (see Figure 39). This ore forms a "horse" in the middle of the old brown ore workings, and is surrounded by red clay. There was no evidence as to the extent of the body.

Analyses

Sample	Number	$Si0_2$	Al_20_3	Fe_20_3	$Ti0_2$	Ign	Total
Average white ..	43 X	11.7	57.3	.4	2.8	27.8	

44. *Skinner Ore Banks No.* 2. Located ¼ mile southwest of No. 43; and is medium hard ore, white matrix and red pisolites. The outcrop is a small lead at the base of a deep cut near the edge of the limonite banks. There is not a great deal of ore in this deposit.

Analyses

Sample	Number	$Si0_2$	Al_20_3	Fe_20_3	$Ti0_2$	Ign	Total
Average soft	44 B	12.5	60.3	1.1	2.3	23.8	
Boulder, red	44 X	11.5	49.7	12.3	3.0	23.5	
Boulder, white ..	44 Y	13.5	55.6	2.4	1.9	26.6	

Talladega County

45. *Parsons.* S. 34, T. 18 S., R. 5 E., ¾ mile south of the Talladega courthouse. The ore in this deposit consists of hard and soft white, pisolitic bauxite and is very good material. The mine was opened in 1918 and closed a year later, some 500 tons having been shipped in 4 months of active operation. The pit is 60 feet long and 20 feet wide (see Figure 40).

Analyses

Sample	Number	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ign	Total
Clay, buff	45	45.2	38.8	1.7	1.5	12.8	
Average, soft	45 B	10.6	56.7	2.8	2.0	27.9	

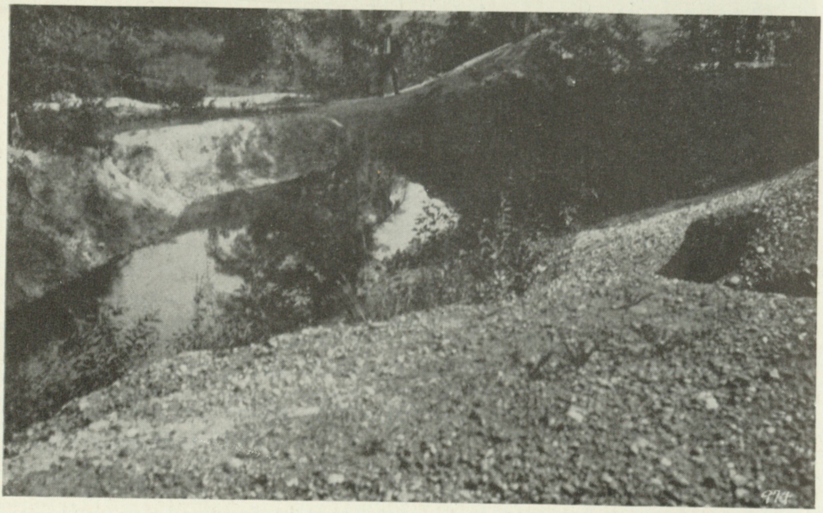

Figure 40:—Parson's Cut, Talladega County, Alabama.

MIDWAY-NANAFALIA CONTACT

This group carries rather extensive deposits in adjacent portions of Barbour and Henry Counties and is an extension of deposits of the same age and character in Georgia. This area was discovered by field men of the Republic Mining and Manufacturing Company of Hermitage, Georgia, and prospected over a period of twelve months—1923-24 by the Republic Company, under the direction of R. E. Rettger. In an outline of the results of this work, Rettger[22] said:

> The writer has recently done considerable detailed work in the district and has had an opportunity to study the various deposits. During the prospecting, which covered a period of about twelve months, some 200 different "shows" were tested on more than 60 properties. From these 200 "shows", 75 deposits were outlined containing a fair amount of merchantable ore. The prospecting consisted of test-pitting and drilling, and in all more than 2,000 bore holes were put down supplemented by many test pits. About 1,000 partial analyses (SIO_2, Fe_2O_3, Al_2O_3, TiO_2, and loss on ignition) were made of bauxite and associated clay.

During the summer of 1925, the author spent nearly two months in this area, studying the deposits as best he could for the outcrops and from such information still available from Rettger's work. Many samples were taken, but they are not likely to give as accurate results as those collected during the detailed prospecting. Since 1925, several short trips have been taken to the area, particularly to see the results of mining in Barbour County.

Stratigraphy The bauxite occurs in occasional channels and pockets in the Clayton limestone, and is surrounded by sands and clays of the Nanafalia formation. In the eastern part of the bauxite area, the Naheola is absent, but it appears over a broad outcrop in the vicinity of Boher Hill. Cooke[23] described the Chattanoochee contact as follows:

> On Chattahoochee River the Nanafalia formation lies directly upon the Clayton limestone. Ancient sink-holes in the Clayton filled with white micaceous sand are plainly exposed on the west bank of the river above the old wagon bridge at Fort Gaines.

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[22] Rettger, R. E. The Bauxite Deposits of Southeastern Alabama. Econ. Geol. Vol. 20, pp. 671-672, 1925. (Complete account, pp. 671-682)

[23] Cooke, C. Nythe. Geology of Alabama. Sp. Rpt. 14, Geol. Surv. of Ala. p. 261, 1926.

The type section in the area is as follows:

Eocene	Wilcox	Nanafalia	175′	Sands and clays, characterized by beds of *Ostrea thirsae* and pseudobuhrstone, with an abundance of fossils.
		Interval		Unconformity
	Midway	Nahedla	110′	Light colored sands and clays, apparently without fossils, and probably represents continental equivalent of the marine beds of West Alabama.
		Interval		Unconformity
		Clayton	200′	Type locality at Clayton, Barbour County, where it consists of white to buff limestone, and calcareous sands. The limestones are abundantly fossiliferous.
Cretaceous	Upper	Interval		Unconformity
		Providence Sand	100′	Coarse red and light colored sands and sandy clay, without fossils, probably representing the typical Providence Sand of Georgia and shallow water deposition.
		Ripley	1000′	Predominating dark glauconitic sands, with interbedded clay and sandy clays, mostly marine and abundantly fossiliferous. The formation gives rise to rugged topography.

Practically all of the ore-bodies occur in the narrow zone of Naheola sediments, which pinch out about the line between Henry and Barbour counties. It is believed that a part of this area was laid and therefore subjected to erosion at the time the Naheola was being laid down, and that the whole area was near sea-level while the Nanafalia was being deposited. The Naheola is very thin in the bauxite area, and it is not libel that the bauxites were formed just before and during Nanafalia time. The surface of the Clayton probably has not changed a great deal from the time erosion had gauged out its channels prior to the deposition of the continental deposits of Naheola time. Then followed the encroachment of the Nanafalia seas, with their abundance of marine life. The deposits of bauxite, therefore, are *within* the Naheola and *between* the Clayton and Nanafalia. The conditions prevailing during the Naheola period were favorable to the formation of bauxite, and additional deposits may be looked for elsewhere in the State between the Clayton and Nanafalia.

Form. The deposits in this area are pot-shaped in form like all others in Alabama, although some of them are a bit irregular. Like northeast Alabama deposits, these are apt to be almost as deep as wide at the top. The deposits invariably grade into clay on all sides, with an occasional clay-horse showing up within an ore-body. Lignite is often associated with both bauxite and clays.

Of the ore-bodies and the ores, Rettger[24] has said:

> The deposits are in general, small. The largest is some 200 feet long and 100 feet wide, but most of them are considerably smaller.
>
> The thickness of the deposits varies from one foot to more than fifty, the average maximum thickness being about fifteen feet.
>
> Here, as in other localities, the bauxite is closely associated with bauxitic clay and clay, there being a complete graduation among the three.
>
> The ore shows the following types: (1) red oolitic, hard; (2) red amorphous, hard; (3) white oolitic, hard or soft; (4) white amorphous, hard or soft, and (5) white amorphous, soft and semi-plastic.
>
> Where red ore is present in a deposit, it is generally near the top and grades downward into pink or white material. The hard ores, in most cases, because of their resistance to erosion, occur as cappings on small hills, whereas the soft ores show no topographic variations. The red color of the ore is due to the presence of iron oxide presumably in the form of limonite which is, in many cases, distinctly secondary. That the red color is secondary is clearly shown by its relation both to the surface and to fissures or cracks in the bauxite. Quite often the staining follows fissures, evidently having seeped into the bauxite from along the crack.

Mining. In the spring of 1927 the Republic Mining and Manufacturing Company stripped two of its best ore-bodies and has been mining ever since that time. The haul is by truck to Eufaula, which, unfortunately for the less important deposits of the region, is 13 miles distant. Were soil facilities more convenient, it is libel that more of the ore-bodies would be developed.

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[24] Rettger, R. E. Bauxite Deposits of Southeastern Alabama. Econ. Geol. Vol. 20, pp. 674-675, 1925.

Very little specific information could be obtained concerning the individual deposits, as core records are not available. However, a summary of the deposits is given below.

Barbour County

Baker Hill Section:

Foy No. 1. — E ½ SW ¼ SE ¼ and W ½ SE ¼ SE ¼ sec. 12, T 9 N, R 27 E; owned in fee simple by the Republic Mining and Manufacturing Company. This deposit is of very small size but good quality and has not yet been worked.

Blakey No. 2 and Floyd No. 1. — SE ¼ SW ¼ NE ¼ and NE ¼ NW ¼ SE ¼ sec. 13, T 9 N. R 27 E; owned in fee simple by Mr. Dixon of Eufaula. This deposit has been completely worked out under lease by the Republic Company.

Floyd No. 3. — NE ¼ SW ¼ NE ¼ sec. 13, T 9 N, R 27 E; owned in fee simple by Mr. Dixon of Eufaula. This deposit is estimated to contain a few hundred tons of red (ferruginous) bauxite.

Blakey No. 4. — E ½ NW ¼ NE ¼ sec. 13, T 9 N, R 27 E; owned in fee simple by Mr. Dixon of Eufaula. This deposit has been completely worked out under lease by the Republic Company.

Floyd No. 5. — E ½ SW ¼ NE ¼ sec. 13, T 9 N, R 27 E; owned in fee simple by Mr. Dixon of Eufaula. This deposit is of insufficient size to be of economic importance.

Jemison No. 4. — NW ¼ SE ¼ SE ¼ sec. 13, T N, R 27 E; owned in fee simple by Mr. Jemison of Eufaula (?). This deposit is not commercial in tenor.

Jemison No. 3. — SE ¼ SE ¼ SE ¼ sec. 13, and NE ¼ NE ¼ sec. 24, T 9 N, R 27 E and SW ¼ SW ¼ SW ¼ sec. 18, T 9 N, R 28 E; owned in fee simple by Mr. Jemison of Eufaula (?). This deposit is too small to be commercially exploited.

Floyd No. 4. — NE 1/4 SE 1/4 NW 1/4 sec. 18, T 9 N, R 28 E; owned in fee simple by Mr. Dixon of Eufaula. This deposit is too small to be economically important.

Fannie Smith No. 1 *and Republic Mining No.* 3. — N 1/2 SW 1/4 NE 1/4 and SE 1/4 NW 1/4 NE1/4 sec. 18, T 9 N, R 28 E; owned in fee simple by the Republic Mining and Manufacturing Company. This deposit has not yet been mined.

White No. 1. — NW 1/4 NE 1/4 SE 1/4 and NE 1/4 NW 1/4 SE 1/4 sec. 18, T 9 N, R 28 E; owned in fee simple by the Republic Mining and Manufacturing Company. This deposit has not yet been mined.

Lewis No 3, *No.* 4 *and No.* 5. — E 1/2 SW 1/4 SE 1/4 and W 1/2 SE 1/4 SE 1/4 sec. 18, T 9 N, R 28 E; owned in fee simple by Mr. Lewis of Eufaula. This deposit has been completely mined out.

Dent No. 4. — SW 1/4 SE 1/4 SE 1/4 sec. 7, and NW 1/4 NE 1/4 NE 1/4 sec. 18, T 9 N, R 28 E; owned in fee simple by the Dent Estate. This deposit has been completly worked out. This original work done in the district by the Republic Company was done here, the Dent mine (see Figure 41) having been opened in 1927.

A. J. Richards No. 1. — SW 1/4 NW 1/4 NE 1/4 sec. 20, T 9 N, R 28 E; owned in fee simple by A. J. Richards.

Richards No. 2. — NW 1/4 NW 1/4 NE 1/4 sec. 20, T 9 N, R 28 E; owned in fee simple by A. J. Richards.

Richards No. 4. — S 1/2 SE 1/4 NW 1/4 sec. 20; owned in fee simple by A. J. Richards.

A. J. Richards No. 5, *A. L. Richards No.* 1, *No.* 2, *and No.* 3. *Espy No.* 17, *No.* 18, *No.* 19, *No.* 20, *No.* 21 *and No.* 23. — NE 1/4 SE 1/4 NE 1/4 and NE 1/4 NE 1/4 sec 20 and N 1/2 SW 1/4 NW 1/4 and S 1/2 NW 1/4 NW 1/4 sec. 21, T 9 N, R 28 E; owned by A. J. Richards, A. L. Richards and E. F. Espy; the Richards property under lease by the Republic Mining and Manufacturing Company.

A. J. Richards No. 6 *and Bradley No.* 2. — SE 1/4 NE 1/4 SW 1/4 and SW 1/4 NW 1/4 sec. 20, T 9 N, R 28 E; owned by A. J. Richards and Bradley under lease to the Republic Mining and Manufacturing Company.

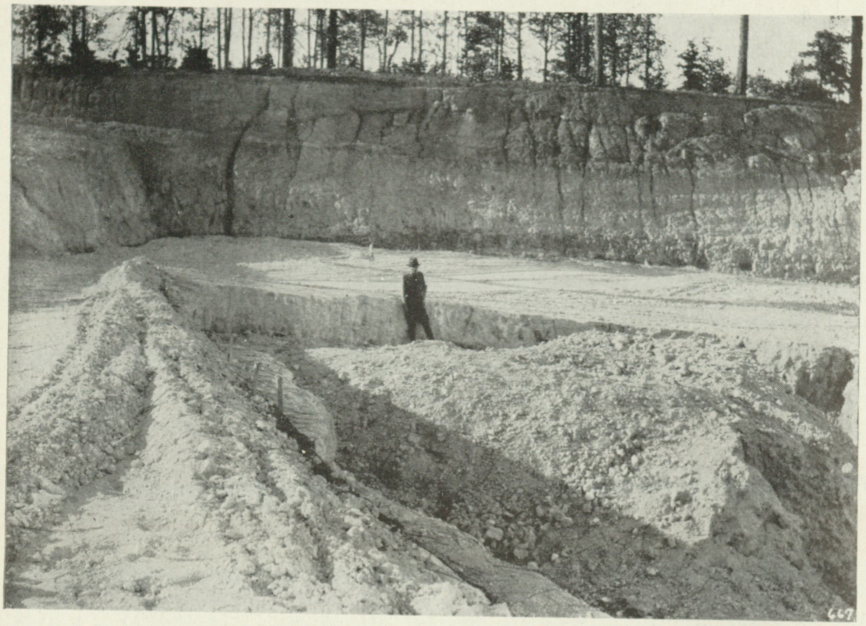

FIGURE 41. Stripped ore body on the Dent place, with a ledge of high grade bauxite exposed, and a mass in the center foreground ready for loading on the trucks. The overlying clays are definitely bedded.

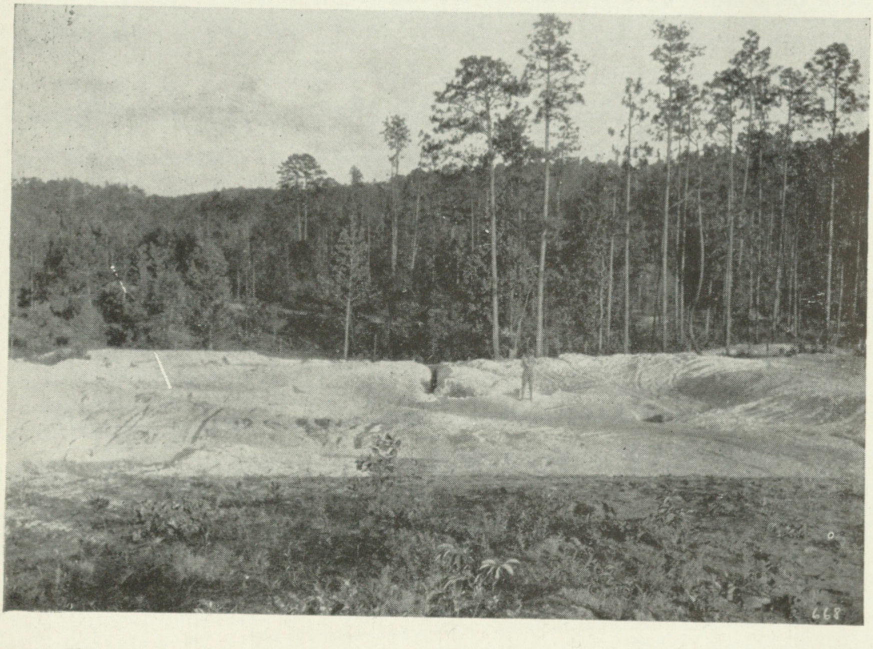

FIGURE 42. Ore-body in process of stripping, one mile east of Richards Cross-Roads. High grade bauxite has already been uncovered in the central portion of the area.

Espy No. 1. — NW ¼ SW ¼ SE ¼ sec. 20, T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

Espy No. 2, *No.* 3, *No.* 4, *No.* 5, *No.* 6. — E ½ SW ¼ SE ¼ and W ¼ SE ¼ sec. 20, T 9 N, R 28 W; owned by E. F. Espy of Eufaula.

Espy No. 7 and No. 14. — NE ¼ NE ¼ SE ¼ sec. 20, T 9 N, R 28 E and NW ¼ SW ¼ SW ¼ sec. 21 T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

Espy No. 8 *and No.* 9. — SE ¼ NW ¼ SE ¼ and SW ¼ NE ¼ SE ¼ sec. 20, T 9 N, R 28 E; owned by E. F Espy of Eufaula.

Espy No. 10. — SE ¼ NW ¼ SE ¼ sec. 20, T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

Espy No. 11. — NE ¼ NE ¼ SE ¼ sec. 20 and NW ¼ NW ¼ SW ¼ sec. 21, T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

Espy No. 12. — NE ¼ NE ¼ SE ¼ sec. 20 and NW ¼ NW ¼ SW ¼ sec. 21, T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

Espy No. 24. — NW ¼ SW ¼ NE ¼ sec. 20, T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

Espy No. 25 *and No.* 26. — E ½ SE ¼ NW ¼ sec. 20, T 9 N, R 28 E; owned by E. F. Espy of Eufaula.

These deposits (No. 58-No. 71) have all been mined out by the Republic and Linnig Companies as far as the white ore is concerned. However. there is some ferruginous bauxite remaining.

E. & F. Lee No. 1, *F. Lee No.* 2. — N ½ SW ¼ SE ¼ sec. 21, T 9 N, R 28 E; owned in fee simple by the Linnig Company.

F. Lee No. 3. — NE ¼ SW ¼ NE ¼ sec. 28, T 9 N, R 28 E; owned in fee simple by the Linnig Company. These three deposits have been worked out.

White Pond Section:

McHellon No. 1. — NW ¼ NW ¼ SE ¼ and SW ¼ SW ¼ NE ¼ sec. 9, T 9 N, R 27 E; owned in fee simple by the Republic Mining and Manufacturing Company.

Shirley No. 1. — SE ¼ SE ¼ NE ¼ sec. 16, T 9 N, R 27 E; owned by L. R. Shirley of Eufaula. This deposit is too small to be of economic importance.

Thomas No. 1. — SE ¼ NE ¼ NW ¼ sec. 20, T 9 N, R 27 E; owned by L. L. Thomas of Eufaula. This deposit is too small to be of economic importance.

Shirley No. 4. — NE ¼ SE ¼ sec. 20, T 9 N, R 27 E; owned by L. R. Shirley Eufaula. This deposit is too small to be of economic importance.

Trammell No. 1. — NW ¼ NW ¼ SW ¼ sec. 21, T 9 N, R 27 E; owned by K. T. Trammell of Eufaula. This deposit is too small to be of economic importance.

Roan Baker No. 1. — SE ¼ NE ¼ SW ¼ sec. 26, T 9 N, R 27 E; owned by Roan Baker, under lease to the Republic Mining and Manufacturing Company. This deposit is now being mined.

Roan Baker No. 2. — NE ¼ SE ¼ SW ¼ and SE ¼ NE ¼ SW ¼ sec. 26, T 9 N, R 27 E; owned by Roan Baker, under lease to the Republic Mining and Manufacturing Company. This is the site of present mining operations.

Roan Baker No. 5 *and No.* 6. — SE ¼ SE ¼ NE ¼ sec. 34, T 9 N, R. 27 E; owned by Roan Baker, under lease to the Republic Mining and Manufacturing Company.

Roan Baker No. 10. — S ½ NE ¼ NE ¼ sec. 34, T 9 N, R 27 E; owned by Roan Baker, under lease by the Republic Mining and Manufacturing Company. This deposit is too small to be of economic importance.

Wood No. 1 *and No.* 2. — SE ¼ SW ¼ SE ¼ sec. 26. T 9 N, R 27 E; owned in fee simple by the Wood Estate, formerly under lease to the Republic Mining and Manufacturing Company.

Wood No. 3. — NE ¼ NE ¼ sec. 35, T 9 N, R 27 E; owned in fee simple by the Wood Estate, formerly under lease to the Republic Mining and Manufacturing Company.

Wood No. 4. — E ½ NE ¼ SE ¼ sec. 35, T 9 N, R 27 E; owned in fee simple by the Wood Estate. This deposit is too small to be of economic importance.

McGilvary No. 1. — S ½ SE ¼ SE ¼ sec. 14, T 9 N, R 27 E; owned by McGilvary of Eufaula. This deposit is too lean and small to be of economic importance.

Griffin No. 4. — W ½ NE ¼ NE ¼ sec. 4, T 8 N, R 27 E; owned by T. M. Griffin of Eufaula. This deposit is too small to be of economic importance.

Henry County

Screamer section:

Republic No. 1. — NE ¼ SW ¼ NW ¼ sec. 20, T 9 N, R 29 E; owned in fee simple by the Republic Mining and Manufacturing Company. This deposit is now being mined by the Republic Company. The pit looks as if several thousand tons of ore have been removed. The exposed overburden is 2-4 feet in thickness and there is a face of ore approximately 10 feet thick.

Lipscomb No. 1 *and No.* 2. — NE ¼ SW ¼ NW ¼ sec. 9, T 8 N. R 29 E; owned by Mr. Lipscomb of Eufaula. This deposit is of no economic importance.

Mathison No. 1. — SE ¼ NE ¼ SE ¼ sec. 11, T 8 N, R 28 E; owned in fee simple by Mr. Mathison of Abbeville. Mr. Mathison reports that there is still several thousand tons of red ore at this locality, although the white ore has been mined.

Richards No. 2. — NW ¼ SW ¼ SW ¼ sec. 1, T 9 N, R 29 E; owned by Joe Richards, under lease to Mr. Mathison of Abbeville. This deposit contains approximately some ferruginous bauxite (50% Al_2O_3).

Davis No. 1. — S ½ NE ¼ NW ¼ and N ½ SE ¼ NW ¼ sec. 36, T. 9 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

Davis No. 2 *and No.* 4. — NW ¼ SE ¼ NW ¼ and NE ¼ SW ¼ NW ¼ sec. 36, T 9 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

Davis No. 3. — W ½ SW ¼ NW ¼ sec. 36, T 9 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

Davis No. 5. — NW ¼ NW ¼ NW ¼ sec. 36, T 9 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

Davis No. 6. — S ½ NW ¼ SW ¼ sec. 36, T 9 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

Davis No. 7. — NE ¼ SW ¼ SW ¼ sec. 36, T 9 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

Davis No. 12. — N ½ NE ¼ NE ¼ sec. 2, T 8 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania.

The foregoing 8 deposits have all been mined by the Republic Company. The white ore has been pretty well mined out, but there is considerable tonnage of red ore left.

Davis No. 8. — NE ¼ NW ¼ NW ¼ sec. 1, T 8 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania. This deposit is too small to be of economic importance.

Davis No. 9 and No. 10. — Middle of NW ¼ sec. 1, T 8 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania. A few hundred tons of ore have been taken out of this deposit and a new opening has been made in the last few months. Mr. Mathison reports that there is considerable tonnage of red ore available here, and that good white ore underlies the red.

Davis No. 11. — NW ¼ NW ¼ SW ¼ sec. 1, T 8 N, R 28 E; owned by W. E. Davis of Henry County, under lease to the Floridan Company of Warren, Pennsylvania. This deposit is too small to be economically important.

Lucas No. 7. — N ½ NE ¼ NE ¼ sec. 35, T 8 N, R 28 E; owned by Mrs. Lucas of Henry County. A few tons of good white ore are reported here.

Lucas No. 2 and No. 3. — SE ¼ SE ¼ NE ¼ sec. 35, T 8 N, R 28 E; owned by Mrs. Lucas of Henry County.

Lucas No. 4. — SW ¼ NE ¼ SE ¼ sec. 35, T 8 N, R 28 E; owned by Mrs. Lucas of Henry County.

Lucas No. 1. — N ½ SW ¼ SW ¼ sec. 36, T 8 N, R 28 E; owned by Mrs. Lucas of Henry County.

Lucas No. 5. — SE ¼ SE ¼ SE ¼ sec. 35, and SW ¼ SW ¼ SW ¼ sec. 36, T 8 N, R 28 E; owned by Mrs. Lucas of Henry County.

These last 4 deposits have had the white ore mined out, but there is considerable tonnage of ferruginous ore remaining.

Scott No. 1, *No.* 2, *and No.* 3. — NE ¼ SE ¼ NE ¼ sec. 35, T 8 N, R 28 E; owned by C. Scott of Henry County under lease to Mr. Mathison of Abbeville and the Floridan Company of Warren, Pennsylvania jointly. A few thousand tons have been mined from this property by Mr. Mathison of Abbeville. Most of the body seems to be already stripped, exposing a considerable surface of red ore, the depth of which is not known.

Hudspeth No. 1 *and Lucas No.* 6. — NE ¼ NW ¼ NE ¼ and NW ¼ NE ¼ NE ¼ sec. 35, T 9 N, R 28 E; owned by Mr. Hudspeth of Henry County, under lease to the Floridan Company of Warren, Pennsylvania, and Mrs. Lucas of Henry County. This deposit has been practically worked out.

MISSISSIPPIAN-CRETACEOUS CONTACT[25]

"Deposits of bauxite belonging to this group are found in Colbert County, of northwestern Alabama, just south of the Tennessee River. Bauxite clays presumably of this group, occur just across the State line in Tishomingo County, Mississippi. Most of the deposits are confined to a 600 acre tract of land located about six miles south of Margerum, a station on the Memphis-Chattanooga division of the Southern Railway System.

The only mention of bauxite in this district is by Burchard[26] who says:

> In the fall of 1921 J. W. Adams, of Tuscumbia, Alabamain prospecting for clays, discovered deposits of bauxite and bauxitic clays near Margerum, Colbert County, Alabama. These deposits are in erosion channels and sink holes in Mississippian limestones that have been partly filled by Cretaceous (Tuscaloosa) gravel.

The deposits referred to are isolated ore bodies about three miles slightly east of south of Margerum, and therefore northeast of the main group. Mr. Adams spent two years prospecting and testing deposits of bauxite in Mississippi, then returned to Colbert County where he extended his discoveries in that section. In about twelve months time Mr. Adams and his workmen dug over sixty test pits and trenches, and about fifty samples were selected for analysis. an accurate map was made showing the location and elevation of test pits. The results of this work were very generously placed at the disposal of the writer, greatly facilitating his field work in the summer of 1925.

Topography.—The surface of the region surrounding the group of deposits consists of a broken, highly dissected upland, representing the western terminus of Tuscumbia Mountain. The area is about 600 feet above sea level, with an average difference of elevation between valleys and hills of about 200 feet. Drainage of the area is into the Big Bear Creek, which empties into the Tennessee River near the Alabama-Mississippi boundary. The rugged topography renders cultivation impracticable; a few patches, garden plots, small orchards, and dilapidated houses mark the scant dozen clearings which break the monotony of the pine and hardwood forests extending for several miles in all directions from the bauxite area.

At present the area is rather inaccessible, since the only outlet is by a wagon road, impassable for motor traffic during the winter season, although should the deposits justify it a new road could be located southward from the bauxite district to connect with a secondary road, and thence to Margerum, the nearest shipping point.

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[25] The following general discussion was published in Econ. Geology, Vol. 21, No. 8, Dec. 1926, pp. 795-798.

[26] Burchard, E. F., "Bauxite in Northeastern Mississippi," U. S. G. S. Bull. 750-G, 1925.

Stratigraphy.—The geological formations exposed in the Margerum District are mainly of Mississippian age, with a blanket of Cretaceous (Tuscaloosa) sand and gravel. The following outline may be of assistance in identifying the bauxite-bearing formations.

There are several fine key beds which enable one to work out the stratigraphic relations accurately and easily, of which perhaps the best are the ledge forming asphaltic members of the Bethel and Gasper formations. Between the asphaltic beds are limestones with abundant silicified fossils that are everywhere thickly matted in the residual soils accumulated over the limestone beds. Another excellent key bed is the layer of Productus limestona about one foot thick at the base of the St. Genevieve formation. This bed is probably encountered more frequently than any other, occurring as it does just below thin bedded shales that are readily disintegrated by weathering agencies, and capping the massive bedded cherty limestones of the Tuscumbia formation, which weather away very slowly. The Hartselle Sandstone makes a good tie point for the upper part of the section.

The surface in the immediate vicinity of the bauxite deposits is almost entirely covered with Tuscaloosa sand and gravel. This blanket was obviously laid down on the much dissected surface of the Mississippian land mass after the long period of emergence.

Moreover it appears that the drainage has not been materially changed from the Post-Mississippian pattern, a view supported by the fact that rock outcrops are found at all altitudes, wherever erosion has removed the Cretaceous sediments. A fine example of this occurs in the midst of the bauxite deposits, where several huge boulders of asphaltic oolite (Gasper), surrounded by Tuscaloosa sands, just out from the side of a ridge.

Form and Character.—The ore bodies of this area are widely distributed and always occupy nests in the thicker portions of the ramaining remnants of Tuscaloosa gravel and clays. In no case were they seen to rest directly upon Mississippian beds. Also, they invariably pass downward into bauxitic clay and clays. In shape, the bodies are irregular. In size, they vary from a few pounds of ore, as observed in one of the shafts, to moderately large bodies several hundred feet in diameter.

The ore is generally pisolitic, with a matrix of chalky material of essentially the same composition as the pisolites. Most of the ore bodies have numerous small streaks of iron carbonate, often weathered to limonite, with some traces of manganese. Frequently these siderite veinlets show evidence of pisolitic texture, suggesting that they were formed at a later period than the bauxite. There is little or no ore in this region that comes under the classification of "hard ore," so characteristic of the other deposits of the State. The predominating type is the loosely cemented pisolitic soft ore which disintegrates into "buckshot" upon short exposure. Incidentally most of this ore is low in iron, while the typical hard ores from the other sections of the State are high in iron content. From this one would be led to regard the hardness of the ore as depending largely upon the amount of iron present.

The prevailing color of the ores and associated clays ranges from almost pure white to buff, with reddish grades sometimes encountered.

Deposits

As has been previously stated, the discovery deposit is about three miles south of Margerum, where ferruginous bauxite outcrops on the west side of a hill and in the ditch along the side of the road. Some bauxite shows up on top of the hill and it is possible that the ore bed may extend to the adjacent hill west of the road. A trench was dug into this deposit along the hill side, and it appears that all of the material at this place is a brown, pisolitic, low-grade ore. Certainly it is comparatively high in iron. Immediately south of and adjacent to this deposit is a thick bed of coarse gravel, while gravel likewise covers the hill to the west. In this respect this deposit is quite similar to those in the main group farther south. However, the nature of the ore is more like that of Henry County than the other Colbert County deposits. The trench was too shallow to determine whether or not high-grade bauxite exists here.

Since the commercial deposits are contained in the group some six miles south of Margerum, and since these were thoroughly prospected and sampled, it is thought advisable to present a detailed description of the group. The list is as follows:

No.	*Type*	*Analysis*	*Location* (T 4 S, R 15 W)
02	Pit	No	NW ½ NW ¼ S 24
2	Pit	No	NW ½ NW ¼ S 24
4	Pit	Yes	NW ½ NW ¼ S 24
6	Tunnel	No	NW ½ NW ¼ S 24
7	Pit	Yes	NW ½ NW ¼ S 24
8	Trench	No	NE ¼ NE ¼ S 23
10	Pit	No	NW ¼ NW ¼ S 24

No.	*Type*	*Analysis*	*Location* (T 4 S, R 15 W)
12	Pit	Yes	NW ¼ NW ¼ S 24
14	Pit	Yes	NW ¼ NW ¼ S 24
16	Pit	No	NW ¼ NW ¼ S 24
18	Pit	Yes	NW ¼ NW ¼ S 24
20	Pit	Yes	NW ¼ NW ¼ S 24
22	Pit	No	NW ¼ NW ¼ S 24
22 A	Pit	No	NW ¼ NW ¼ S 24
24	Pit	No	
26	Pit	No	
28	Pit	Yes	SW ¼ SW ¼ S 13
30	Pit	Yes	SW ¼ SW ¼ S 13
31	Pit	No	SW ¼ SW ¼ S 13
32	Pit	No	
34	Pit	No	SE ¼ SE ¼ S 14
36	Pit	No	SE ¼ SE ¼ S 14
38	Pit	Yes	SE ¼ SE ¼ S 14
40	Pit	No	SE ¼ SE ¼ S 14
42	Pit	No	
44	Pit	No	
46	Trench	No	NE ¼ NE ¼ S 23
48	Pit	No	NW ¼ NE ¼ S 23
50	Pit	Yes	NW ¼ NE ¼ S 23
51	Pit	No	
52	Pit	No	NE ¼ NE ¼ S 23
54	Pit	Yes	NE ¼ NE ¼ S 23
56	Trench	No	NE ¼ NE ¼ S 23
58	Pit	No	NE ¼ NE ¼ S 23
60	Trench	No	SE ¼ NE ¼ S 23
62	Pit	No	SE ¼ NE ¼ S 23
64	Trench	No	SE ¼ NE ¼ S 23

No.	*Type*	*Analysis*	*Location* (T 4 S, R 15 W)
66	Pit	Yes	SE ¼ NE ¼ S 23
67	Pit	Yes	SE ¼ NE ¼ S 23
68	Pit	No	SE ¼ NE ¼ S 23
70	Pit	No	NE ¼ SE ¼ S 23
72	Trench	No	NE ¼ SE ¼ S 23
74	Pit	Yes	NE ¼ SE ¼ S 23
75	Pit	Yes	SE ¼ SE ¼ S 23
76	Pit	Yes	SE ¼ SE ¼ S 23
77	Pit	Yes	NE ¼ SE ¼ S 23
78	Trench	No	NE ¼ SE ¼ S 23
79	Pit	Yes	NE ¼ SE ¼ S 23
80	Pit	No	SE ¼ SE ¼ S 23
81	Pit	No	SE ¼ SE ¼ S 23
82	Pit	No	
83	Pit	Yes	SW ¼ SE ¼ S 23
84	Pit	No	SE ¼ SE ¼ S 23
85	Pit	Yes	SW ¼ NW ¼ S 24
86	Trench	No	SW ¼ NW ¼ S 24
88	Pit	No	SW ¼ NW ¼ S 24
90	Trench	No	SW ¼ NW ¼ S 24
91	Pit	No	SW ¼ NW ¼ S 24
92	Pit	Yes	SW ¼ NW ¼ S 24
93	Pit	No	SW ¼ NW ¼ S 24
94	Pit	No	
95	Pit	No	NW ¼ NW ¼ S 24
96	Trench	No	NW ¼ NW ¼ S 24
98	Pit	No	NW ¼ NW ¼ S 24
100	Pit	Yes	
102	Pit	No	

The following elevations are from a bench mark in the NW corner of section 24, the altitude of which has been roughly determined at 600 feet about sea level. The exact elevations are unknown.

Test Pit No. 2 ELEV. 522 feet DEPTH 17 feet

Depth	Material	Sample
3 ft.	Curb	
13 ft.	Sandy bauxite	none
1 ft.	Sand	none

Test Pit No. 02 ELEV. 550 feet DEPTH 3 feet

All sand bauxite clay. Not sampled.

Test Pit No. 4 ELEV. 495 feet DEPTH 3 feet

Depth	Material	Sample
3 ft.	Bauxite	No. 30

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 30	23.00	52.59	2.67	20.76

Ore outcrops in branch. Pit could not be dug deeper on account of the water.

Tunnel No. 6 ELEV. 483 feet LENGTH 33 feet

Sand to ferruginous sandstone in face. Test Pit No. 7 is just above the tunnel, and judging from the elevation the tunnel would probably run under the ore. No sample was taken.

Test Pit No. 7 ELEV. 519 feet DEPTH

Depth	Material	Sample
4.3 ft.	Curb	none
3.5 ft.	Ore	No. 22
4.1 ft.	Ore	No. 21
.7 ft.	Ore	No. 20

	SiO_2	Al_2O_3	Fe_2O_2	Loss on ignition
Sample No. 22	21.00	46.20	9.00	21.80
Sample No. 21	22.00	52.88	2.00	22.60
Sample No. 20	23.24	51.18	1.42	22.50

Trench No. 8 ELEV. 505 feet LENGTH 45 feet

35 feet of ore and bauxite clay.

Test Pit No. 10 ELEV. 505 feet DEPTH 17 feet

Depth	Material	Sample
8 ft.	Gravel & clay	none
9 ft.	Bauxite clay	none

Bauxite clay in bottom of pit.

Test Pit No. 12 ELEV. 512 feet DEPTH 21.2 feet

Depth	Material	Sample
4 ft.	Curb	none
8.4 ft.	Ore	No. 32
3.6 ft.	Ore	No. 31
5.2 ft.	Ore	none

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 32	16.28	54.11	2.85	25.00
Sample No. 31	21.84	49.37	4.71	22.60

Ore in botton of pit.

Test Pit No. 14 ELEV. 521 feet DEPTH 31.1 feet

Depth	Material	Sample
4 ft.	Curb	
4 ft.	Iron clay	
	Iron bauxite	
15.6 ft.	Ore	No. 23
	Ore	No. 24
	Ore	No. 25
7.5 ft.	Red and white bauxite clay	

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 23	27.20	45.02	7.14	18.64
Sample No. 24	30.40	45.08	5.00	17.76
Sample No. 25	37.00	40.37	5.71	15.60

Test Pit No. 16 ELEV. 557 feet DEPTH 30.6 feet

All sand and gravel. No samples taken.

Test Pit No. 18 ELEV. 575 feet DEPTH 41.6 feet

Depth	Material	Sample
3 ft.	Curb	
3 ft.	Bauzite	none
3 ft.	Bauxite & clay	
31 ft.	Ore	No. 1
	Ore	No. 2
	Ore	No. 5
	Ore	No. 17
	Ore	No. 15
	Ore	none
4.6 ft.	Sand	

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 1	34.40	45.77	2.71	15.04
Sample No. 2	23.72	50.55	3.85	20.60
Sample No. 5	23.48	51.44	2.85	20.04
Sample No. 17	38.68	40.60	4.00	14.20
Sample No. 15	30.32	48.16	2.00	16.40

Test Pit No. 20 ELEV. 573 feet DEPTH 13 feet

Depth	Material	Sample
2 ft.	Surface	none
11 ft.	Ore	No. 3
	Ore	No. 22

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 3	14.34	54.82	3.42	25.80
Sample No. 22	21.00	47.00	5.00	25.00

Ore in bottom.

Test Pit No. 22 (2 pits) ELEV. 578 feet DEPTH

No. 22	No. 22A
No. 1-10′	No. 2-14′

Sandy clay with some float bauxite.

Test Pit No. 24 ELEV. 557 feet DEPTH 9 feet

All sandy clay. No sample.

Test Pit. No. 26 ELEV. 578 feet DEPTH 19 feet

Sandy clay with little ore.

Test Pit No. 28 ELEV. 561 feet DEPTH 7.6 feet

Depth	Material	Sample
4 ft.	Surface	
3.6 ft.	Ore	No. 23
Bottom	Ore	No. 24

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 23	33.40	40.88	10.14	14.36
Sample No. 24	33.96	45.07	2.57	17.00

Test Pit No. 30 ELEV. 551 feet DEPTH 8.6 feet

Depth	Material	Sample
2 ft.	Surface	
6.6 ft.	Ore	No. 25
Bottom	Ore	

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 25	43.40	38.39	4.57	13.00

The ore shows an abundance of free silica in large grains. With this silicia washed out the ore would be very high grade.

Test Pit No. 31 ELEV. 550 feet DEPTH 9 feet

Depth	Material	Sample
2 ft.	Surface	
7 ft.	Ore	

Showing good bauxite structure but much coarse sand.

Test Pit No. 32.— ELEV. 540 feet DEPTH 9 feet

Gravel, decomposed gravel, and clay. Not sampled.

Test Pit No. 34.— ELEV. 561 feet DEPTH 25 feet

Depth	Material	Sample
3 ft.	Surface	
4 ft.	Sand and bauxite	none
18 ft.	Sand, clay, bauxite clay	none

Test Pit No. 36.— ELEV. 533 feet DEPTH 11 feet

Depth	Material	Sample
2 ft.	Surface	
9 ft.	Bauxite clay	
	Ferruginous sandstone	none

Test Pit No. 38.— ELEV. 540 feet DEPTH 18 feet

Depth	Material	Sample
2 ft.	Surface	
16 ft.	Ore	No. 29

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 29	40.56	40.40	4.28	13.16

Test Pit No. 40.— ELEV. 514 feet DEPTH 18 feet

Depth	Material	Sample
1.6 ft.	Surface	
16.6 ft.	Ore	by Morse
Bottom	Ore	

Test Pit No. 42.— ELEV. 411 feet DEPTH 10 feet

Location made but pit could not be sunk on account of water

Estimated tonnage: 2,000 tons

Test Pit No. 44.— ELEV. 439 feet DEPTH 10.6 feet

Location made in bed of branch but pit could not be sunk on account of water.

Trench No. 48.— ELEV. 454 to 489 feet LENGTH 115 feet

Sand
50 ft. of ore.
Sand, clay and gravel
Ore
Ore
Gravel

Test Pit No. 48.— ELEV. 451 feet DEPTH 5 feet

Some bauxitic clay. Not sampled.

Test Pit No. 50.— ELEV. 475 feet DEPTH 27 feet

Depth	Material	Sample
Surface	Ore	
	Ore	No. 012
	Ore	No. 011
27 ft.	Ore	
	Ore	
Bottom	Bauxitic clay	

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 012	22.64	45.33	3.71	29.00
Sample No. 011	35.00	43.00	3.14	16.64

Test Pit No. 51.— ELEV. 480 feet DEPTH 5 feet

Surface—Bauxitic drift.

Red, yellowish and white clay.

Bottom—White clay

---- Edge of ore-body

Test Pit No. 52.— ELEV. 514 feet DEPTH 5.6 feet

Sandy bauxitic clay.

Test Pit No. 54.— ELEV. 511 feet DEPTH 31 feet

Depth	Material	Sample
1 ft.	Surface	
	Ore	No. 019
	Ore	No. 020
30 ft.	Ore	No. 021
Bottom	Ore	

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 019	39.64	39.58	5.42	13.60
Sample No. 020	36.44	37.23	11.57	13.40
Sample No. 021	45.20	37.71	1.37	13.16

Trench No. 56.— ELEV. 508 to 528 feet LENGTH 75 feet

Sand

75 feet of ore

Test Pit No. 58.— ELEV. 513 feet DEPTH 5 feet

Some bauxite. Not sampled.

Trench No. 60.— ELEV. 498 to 510 feet LENGTH 70 feet

Clay and float ore

50 feet white ore

Test Pit No. 62.— ELEV. 493 feet DEPTH 10 feet

Gravel

Sand

Gravel

Trench No. 64.— ELEV. 455 to 468 feet LENGTH 90 feet

Coarse yellow sand.

Low grade ore.

Low grade ore.

Low grade ore.

75 feet of low grade ore carrying coarse grains of sand.

Test Pit No. 66.— ELEV. 448 feet DEPTH 16.6 feet

Depth	Material	Sample
3 feet	Surface	
8 feet	Ore	No. 030
5.6 feet	Ore	No. 040
Bottom	Ore	

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 030	25.56	54.50	2.70	16.68
Sample No. 040	32.64	44.20	4.60	18.16

Test Pit No. 67.— ELEV. 478 feet DEPTH 10 feet

Depth	Material	Sample
4 ft.	Surface	
6 feet	Ore	No. 28

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 28	37.00	45.44	1.57	15.40

Test Pit No. 68.— ELEV. 460 feet DEPTH 12.6

Depth	Material	Sample
1.6 ft.	Surface	
4 ft.	Ore	none
3 ft.	Iron and plastic clay	
4 ft.	White and yellow plastic clay	

Test Pit No. 70.— ELEV. 467 feet DEPTH 6.6 feet

Depth	Material
4.6 ft.	Ore
2 ft.	Clay and iron

Test Pit No. 74.— ELEV. 510 feet DEPTH 27 feet

Depth	Material	Sample
3 ft.	Surface	
13 ft.	Ore	No. 050
	Ore	No. 060
11 ft.	High grade bauxitic clay.	No sample
Bottom	Same	
27 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 050	20.58	52.86	1.50	24.64
Sample No. 060	21.08	53.68	1.60	21.08

Test Pit No. 75.— ELEV. 535 feet DEPTH 44.3 feet

Depth	Material	Sample
4.9 ft.	Surface	
8.5 ft.	Ore	No. 4
3.6 ft.	Ore	No. 3
4.0 ft.	Ore	No. 2
9.3 ft.	Ore	No. 13
14.0 ft.	Ore	No. 14
44.3 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 4	30.60	46.42	3.14	19.56
Sample No. 3	26.80	49.26	3.71	19.28
Sample No. 2	26.00	48.60	5.00	20.20
Sample No. 13	29.56	44.20	7.28	17.64
Sample No. 14	33.12	45.96	3.00	16.28

Test Pit No. 76.— ELEV. 522 feet DEPTH 13 feet.

Depth	Material	Sample
3 ft.	Surface	
10 ft.	Ore	No. 10
Bottom	Clay with sandy bauxite	No. 9
13 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 10	42.08	40.48	.85	13.00
Sample No. 9	38.40	35.08	13.28	13.16

Test Pit No. 77.— ELEV. 535 feet DEPTH 18.6 feet

Depth	Material	Sample
5 ft.	Surface	
4 ft.	Ore	No. 8
4 ft.	Ore	No. 7
5.6 ft.	Ore	No. 18
Bottom	Ore	No. 19
18.6 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 8	42.08	42.28	2.00	13.00
Sample No. 7	42.40	42.50	1.28	13.24
Sample No. 18	42.60	41.81	1.71	13.64
Sample No. 19	43.56	42.16	.85	13.24

Trench No. 72.— ELEV. 503 to 512 feet LENGTH 135 feet

30 feet of good ore.

Trench No. 78.— ELEV. 540 to 548 feet LENGTH 50 feet

40 feet of good ore.

Test Pit No. 79.— ELEV. 535 feet DEPTH 17.3 feet

Depth	Material	Sample
6.2	Surface	
4 ft.	Ore	No. 15
6.6 ft.	Ore	No. 16
Bottom	Ore	none
17.3 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 15	43.60	38.16	2.00	14.56
Sample No. 16	42.40	41.70	.90	13.48

Test Pit No. 80.— ELEV. 537 feet DEPTH 7 feet

Depth	Material
3 ft.	Surface
4 ft.	White bauxitic clay
Bottom	White bauxitic clay
7 ft. Total	

Test Pit No. 81.— ELEV. 517 feet DEPTH 13 feet

Depth	Material	Sample
3.6 ft.	Surface	none
5.6 ft.	Ore	none
4 ft.	Bauxitic clay	none
13 ft. Total		

Test Pit No. 82.— ELEV. 545 feet DEPTH 3 feet

Clay and sandstone. No sample taken.

Test Pit No. 83.— ELEV. 521 feet DEPTH 11 feet

Depth	Material	Sample
3 ft.	Surface	
8 ft.	Ore	No. 26
Bottom	Ore	none
11 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 26	37.12	42.79	2.57	16.16

Test Pit No. 84.— ELEV. 519 feet DEPTH 15.6 feet

Depth	Material
11.6 ft.	Gravel and sand
4 ft.	Bauxite with much coarse sand
Bottom	Ore

Test Pit No. 85.— ELEV. 541 feet DEPTH 7 feet

Depth	Material	Sample
3 ft.	Surface	
4 ft.	Ore	No. 27

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 27	43.40	39.26	3.14	12.60

Trench No. 86.— ELEV. 512 to 522 feet LENGTH 50 feet

Clay
50 ft. ore
Iron and clay

Test Pit No. 88.— ELEV. 522 feet. DEPTH 10 feet

Depth	Material
3 ft.	Gravel and sand
5 ft.	Clay and ore
2 ft.	Ore
Bottom	Ore
10 ft. Total	

Pit was unfinished when work stopped.

Trench No. 90.— ELEV. 506 to 524 feet LENGTH 100 feet

15 ft. sand
85 ft. ore, clay and sand

Test Pit No. 91.— ELEV. about 500 feet DEPTH 4 feet

Depth	Material
4 ft.	Bauxite, mostly pebble or buckshot ore

Test Pit No. 92.— ELEV. 492 feet DEPTH 30 feet

Depth	Material	Sample
4 ft.	Surface	
6 ft.	Ore	No. 0020
4.4 ft.	Ore	No. 010
15.8 ft.	Ore	About the same as Sample No. 010
Botton	Ore	

30 ft. Total

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 0020	33.60	45.08	1.80	16.00
Sample No. 010	40.68	40.44	3.60	14.80

Test Pit No. 93.— ELEV. 510 feet DEPTH 4 feet

Depth	Material
4 ft.	Bauxite, buckshot ore

Test Pit No. 94.— ELEV. 531 feet DEPTH 9 feet

Sand and ferruginous sandstone. No sample

Test Pit No. 95.— ELEV. 520 feet DEPTH 4 feet

Depth	Material
4 ft.	Bauxite, buckshot ore

Trench No. 96.— ELEV. 551 to 575 feet LENGTH 185 feet

Gravel, sand, and clay
Sand and clay
Good white bauxite
Sand and clay
Ore
Clay
Ore
Clay
Ore
Clay

Test Pit No. 98.— ELEV. 566 feet DEPTH 14 feet

Depth	Material
2 ft.	Surface
3 ft.	Hard ore
2 ft.	Soft ore
1 ft.	Bauxitic clay
6 ft.	Sandy bauxitic clay

14 ft. Total

Test Pit No. 100.— ELEV. 572 feet DEPTH 19.2 feet

Depth	Material	Sample
4.4 ft.	Ore	No. 08
4.2 ft.	Ore	No. 07
4 ft.	Ore	No. 06
2.6 ft.	Ore	About the same as sample No. 06
4 ft.	Sand, clay and iron	
Bottom	Yellow coarse sand	
19.2 ft. Total		

	SiO_2	Al_2O_3	Fe_2O_3	Loss on ignition
Sample No. 08	28.44	48.14	2.42	18.84
Sample No. 07	29.72	45.78	4.42	18.20
Sample No. 06	29.24	45.02	6.14	18.38

Test Pit No. 102.— ELEV. 563 feet DEPTH 10 feet

All sandy clay. No sample.

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